THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXIII. No. 571.] LONDON, APRIL 21, 1874. [26th Year.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL

COAL. Analysis—10,000 cubic feet of gas per ton of coal; 34-candle gas; 12¼ cwt. coke per ton of coal.

The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.

RAMSAY'S PATENT CONDENSED COKE.

DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.

GAS-RETORTS, introduced 1808. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.

Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Hondurus Wharf, Cubit Town. Large stocks kept.

Address G. H. Ramsay, Newcastle-on-Tyne.

GENUINE TORBAY PAINT

AND

ANTI-GALVANIC PAINT.

FOUR PRIZE MEDALS.

WORKS: BRIXHAM, TORBAY.

These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.

They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.

The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.

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SETTING RETORTS,

ERECTING AND REMODELLING GAS-WORKS OF ANY EXTENT,

AT HOME OR ABROAD.

Address—

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COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, BLAYDON-ON-TYNE,

Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

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THE ALMA WORKS, WALSALL.

Established at the commencement of Gas Lighting.

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COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
15, SOHO SQUARE, } LONDON

35, 36, 37, & 39, GRANBY ROW, MANCHESTER.

J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.

Lists may be obtained on application to

69, UPPER THAMES STREET, LONDON.

JOHN BENT & SON,

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WET AND DRY GAS-METERS,

OF

FIRST-CLASS MATERIALS & WORKMANSHIP;

Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.

Established 1830.

THOMAS PIGGOTT & CO.,

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MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO,

And Gas Apparatus of every Description.

Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.

Sugar, Saltpetre, and all kinds of Pans.

Roofs, Girders, and Bridges, and General Smith's Work.

London Agent—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

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J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.

They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.

Messrs. Romans, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.

Analysis, prices, and other information will be forwarded on application to their Offices, 8, Forth Street, Edinburgh; 1, Walbrook, Mansion House, London, or to the "Crown Wharf," Thomas Street, Limehouse, London, whose stocks of house, steam, and gas coal are always on hand.

Coal, machinery, fire goods, &c., shipped to all parts of the world.

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DUKE OF HAMILTON'S

LESMAHAGOW

CANNEL COAL.

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GEORGE GLOVER & CO.,

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NATIONAL STANDARD GASOMETERS

For the English Government, and for the Government of the Netherlands;

MAKERS OF THE DUPLICATE COPY

Presented by Her Majesty's Government to the French Government;

AND MANUFACTURERS OF

IMPROVED DRY GAS-METERS,

Warranted to Measure correctly, and not to vary.

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236, GEORGE STREET, GLASGOW; and 15, MARKET STREET, MANCHESTER.

G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

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LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

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MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

JAMES GREGORY AND SONS,

MANUFACTURERS OF EVERY DESCRIPTION OF

Corporate Mark SOHO Granted 1763.

STEEL TOOLS FOR GAS & WATER WORKS.

All-Steel Charging and Stoking Shovels, Coke Screens and Forks, Steel Scoops, Picks, Mattocks, Axes, Trowels, &c.

WELDING STEEL RAKE AND SPUD HEADS.

SUPERIOR CAST-STEEL FILES and SAWS; Solid Cast-Steel Hand and Sledge Hammers.

BEST CAST STEEL for making Chisels, Turning Tools, Taps and Dies, Drills, Snaps, &c.

SINGLE AND DOUBLE SHEAR, Spring, Sheet, and Blister Steel.

SILVER STEEL for Rod-Chisels and Diamond-Points for Cutting Cast-Iron Pipes, and for other work requiring a Special Quality and Temper, and every other description of Steel and Tools as supplied to the largest London Gas Companies, Contractors, and Engineers.

SOHO STEEL-WORKS, SHEFFIELD, & 2, GRESHAM BUILDINGS, BASINGHALL ST., LONDON, E.C.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON, } Joint Managing Directors.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

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JAMES RUSSELL & SONS, LIMITED,

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ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

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MANUFACTURERS OF

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CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

London Agent: W. G. DAVIS, 2, BRABANT COURT, PHILPOT LANE, E.C.

HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS.

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

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LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS,

BY

Spence's Patent Dry Copperas,

The only Purifying Material which removes, by one process, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of four years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION.

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,

VICTORIA CHEMICAL WORKS, ASHTON NEW ROAD, BRADFORD, MANCHESTER,

Manufacturers of SPENCE'S PATENT DRY COPPERAS; GREEN COPPERAS;

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SULPHATE OF AMMONIA, GREY AND BROWN; SULPHURIC ACID; MUDIE'S DISINFECTANT, &c.

CONTRACTORS FOR THE PURCHASE OF SPENT OXIDE.

ALL COMMUNICATIONS TO BE ADDRESSED TO THE WORKS.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

THE IMPERIAL METER COMPANY, LIMITED,

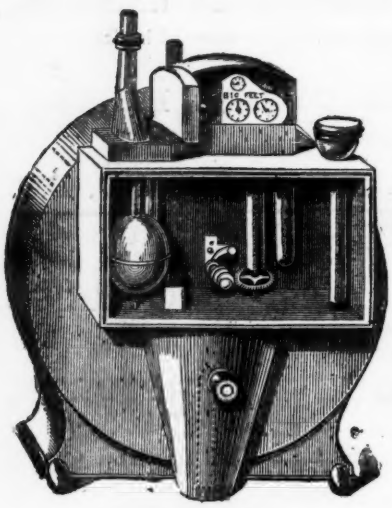
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

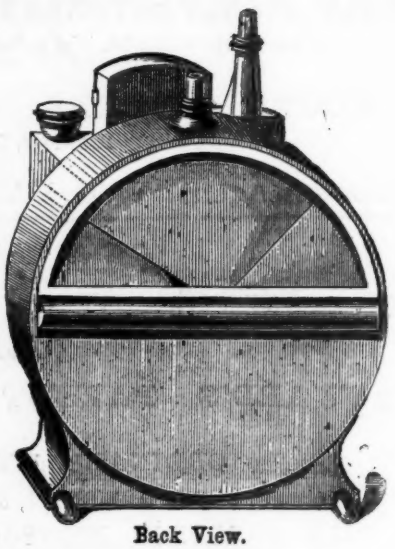
IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.



Back View.

I. This Meter is more simple in construction than the common non-compensating Meter.
II. An unvarying water-line is maintained.
III. No amount or kind of pressure will cause it to "flood."
IV. It is practically unaffected by "tilting."
V. The friction is less than in any other Meter; and
VI. It will last for twelve months without requiring to be refilled.

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

SPECIAL ATTENTION

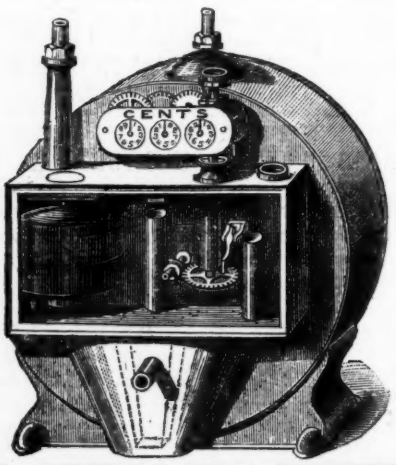
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER.

Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

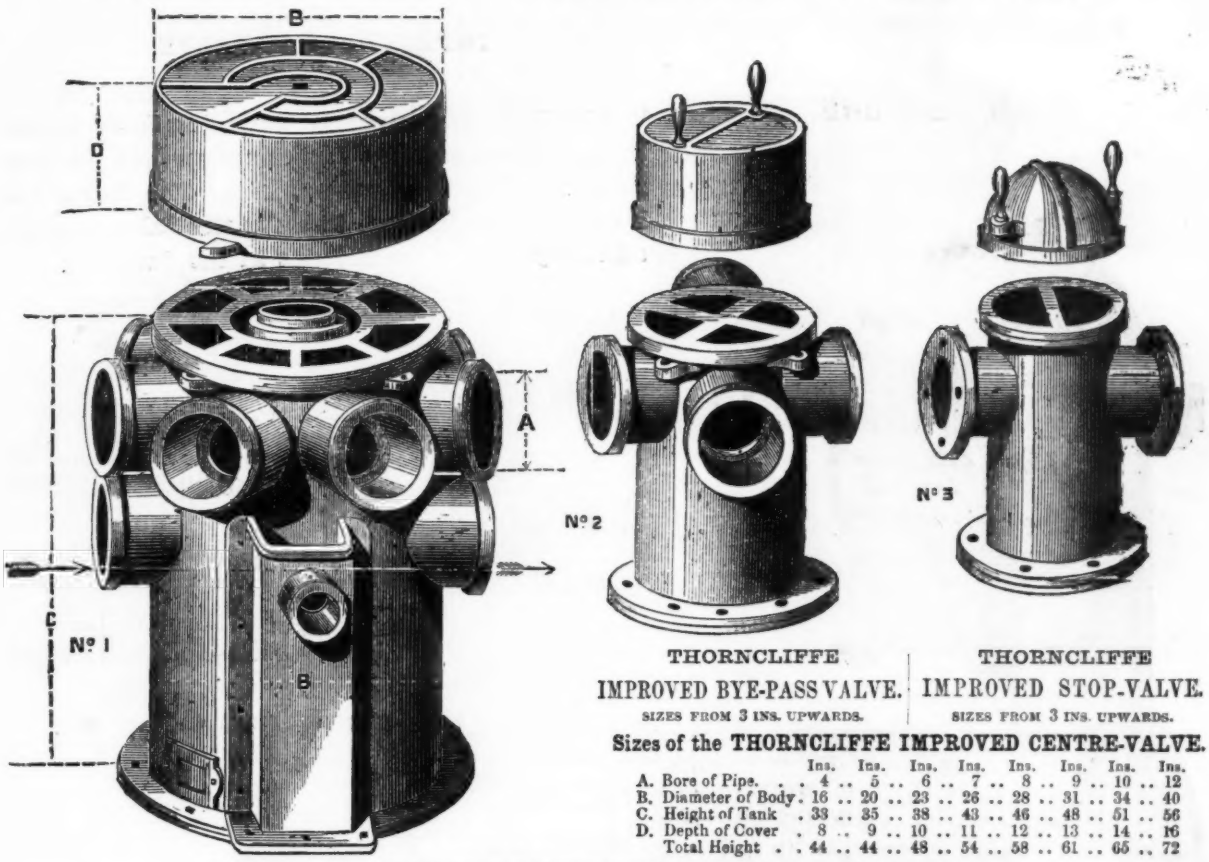
W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.



THORNCLIFFE IMPROVED BYE-PASS VALVE. SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

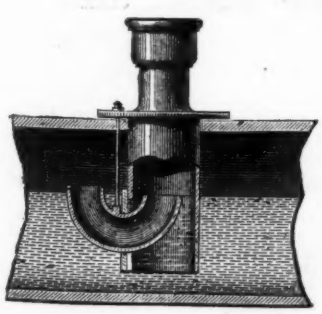
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



Messrs. N. C. & Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING DIP-PIPES.

These Patent Self-Acting Dip-Pipes are rapidly coming into general use by gas companies. By their use the whole of the pressure caused by the old kind of Dip-Pipes is entirely removed, therefore the yield of gas per ton of coal is considerably increased. They also act as a perfect safeguard against the deposit of carbon (or scurf) inside the retorts.

A saving of fuel is effected, and the wear and tear to the retorts greatly diminished.

They are also perfectly Self-Acting, they being regulated solely by the gas. They cannot get out of repair, and when once fixed, will last as long as the old kind, and can be easily adjusted should the hydraulic main sink; they can also be worked with advantage where there is no exhauster.

Testimonials can be had from Herbert Unwin, Esq., engineer of the Sheffield United Gaslight Company and the Penistone Gas Company. At both these companies works they have been in constant operation for several months. Further testimonials can be had on application to the Patentee, J. G. Hawkins, Effingham Street Gas-Works, Sheffield.

For Prices, &c., apply to

Messrs. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, near SHEFFIELD.

GEORGE WALLER & CO.,

GAS ENGINEERS AND CONTRACTORS,

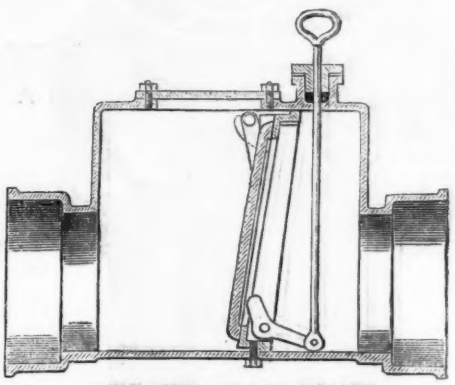
MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS-EXHAUSTERS, COMBINED ENGINES AND EXHAUSTERS.

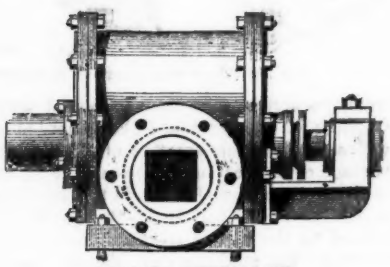
IMPROVED GAS-VALVE

IMPROVED GAS-VALVE.

The Door has a wedged back, the Body is cast in one piece, and the Valves are proved on both sides to 30 lbs. per square inch. The Index has large studs to indicate how far the Valve is open, and they can be readily felt in the dark.



SELF-ACTING BYE-PASS VALVE.



BEALE'S EXHAUSTER.

PUMPS, VALVES (2 in. to 30 in.), HYDRAULIC REGULATORS, ENGINES, &c., in STOCK.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, SOUTHWARK, S.E.,

AND AT

STROUD, GLOUCESTERSHIRE.

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.

This Paint having been in general use over twelve years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

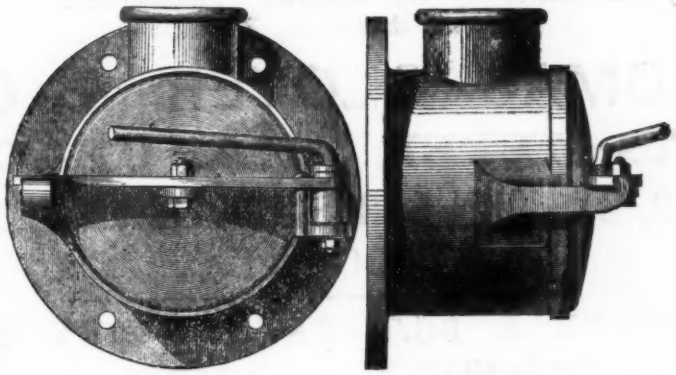
HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 10,000 IN USE.

NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW. SIDE VIEW.

SIMPLE.

ECONOMICAL

DURABLE

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

These Lids are Adopted by the following (among many other) Gas Companies:—

The Gaslight Company, Beckton (where over 2000 are in use).
" Gaslight Company, Bow Common.
" London Gaslight Company.
" Independent Gaslight Company.
" Phœnix Gaslight Company.
" South Metropolitan Gaslight Co.
" West Ham Gas Company.
" Imperial Gaslight Company.
" Gas-Works, Arsenal, Woolwich.
" Commercial Gas Company.
" Alliance and Dublin Gas-Works.
" Edinburgh Gas-Works.
" Manchester Corporatn. Gas-Works.
The Salford Corporation Gas-Works.
" Rochdale Corporation Gas-Works.
" Liverpool United Gas-Works.
" Birkenhead Gas-Works.
" Birmingham Gas-Works.
" Nottingham Gas-Works.
" Newcastle-on-Tyne Gas-Works.
The Carmarthen Gas-Works.
" Merthyr Tydfil Gas-Works.
" Ystrad Gas-Works.
" St. Alban's Gas-Works.
" Over Darwen Gas-Works.
" Aylesbury Gas-Works.
" Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

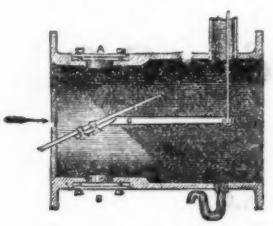
The following important Testimonial, among others, has been given:—

"*The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov. 14, 1871.*

"Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) "F. J. EVANS."

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

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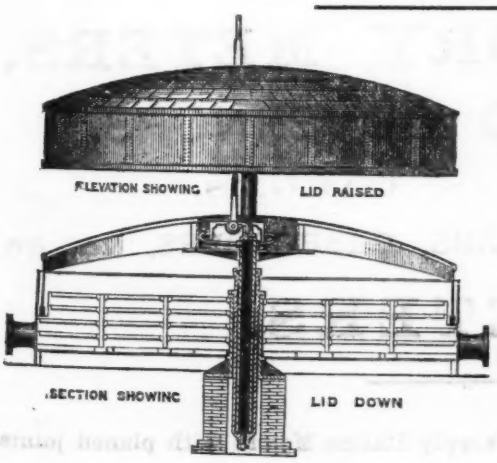
The Gaslight Company—a 6 in. at the Gas-Works, Beckton.
The London Gas Company—an 18 in. at the Gas-Works, Nine Elms.
" " an 8 in. at " "
" " a 24 in. at " "

Also at the Gas-Works, Rochdale, Monmouth, Devonport, Cannes, and Mentone (France), &c.



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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, APRIL 21, 1874.

Circular to Gas Companies.

THE committee business of the House of Commons begins on Thursday next, and the first Bill to be taken is the Tunbridge Wells Gas Bill. The proceedings are likely to possess considerable interest, in consequence of the action taken by the Local Board of Tunbridge Wells, who are endeavouring to force the company to sell the undertaking. To this, the company have a very strong objection, and we have now to see how a committee of the new Parliament will deal with such cases of dispute. The tactics of the Local Board, since the company refused their offer, are not to be commended. They oppose the company on a site selected for new works, and propose an alternative site. This turns out to be land owned by the Board, which they refuse to sell.

The purchase of the Birmingham Gas Company by the Corporation may now be said to be an accomplished fact. The towns meeting passed the resolution proposed by the mayor, and on a poll being demanded and taken, the result was confirmed by a majority of 1303 votes and 566 voters. The proceedings, we may here remark, illustrate the apathy displayed by the public with regard to corporate matters, to which we alluded a short time ago. There are in Birmingham 53,000 persons entitled to vote on this question. The number who took the trouble to go to the poll was 1902. The opposition offered at the meeting to the proposal of the mayor were, we are bound to say, weak. Councillor Stone did point out that corporate profits on the manufacture of gas are really nothing more nor less than indirect taxes; but the general opposition seemed to be dictated by an opinion that the Corporation were paying too much for the undertakings, the fact being that they are getting them remarkably cheap; and further, that Birmingham would be overburdened by a debt, which will, however, be very much more than covered by the value of the property the Corporation take possession of. From the speech of the mayor, we learn that the Corporation of Walsall are moving to purchase so much of the Birmingham and Staffordshire undertaking as lies within their limits. We notice also that the Local Board of Balsall Heath are being stimulated to take up the question, the consumers there objecting to pay taxes in the shape of gas profits for the benefit of Birmingham.

The Corporation of Southport have been successful in their application for power to raise the maximum price of gas, and reduce the illuminating power.

The Chartered Company have notified to the Metropolitan Board of Works the discontinuance of the manufacture of gas at the Horseferry Road station during the summer half year. We presume the manufacture has also ceased at the City works, and thus all the common gas of the company supplied to London now comes from Beckton.

We are able to-day to present to our readers an illustrative plate, with a full description, of the beautiful machinery invented by Mr. Foulis, of Glasgow, for drawing and charging retorts by hydraulic agency. The merits of this machine are so obvious, that nothing need be said here to commend it to the attention of all concerned in the management of gas-works. In the language of Dr. Glover, who addressed our readers on the subject, some weeks ago, the machine "is the perfect solution of a difficulty "which has long been felt as an opprobrium in gas manu-"facture. A large saving of labour and consequent expense is "effected; and gas companies, by this simple and efficient contri-"vance, are placed beyond the dangerous risks and loss conse-"quent on strikes and other contingencies." The actual saving effected will vary in particular cases. At the present time Mr. Foulis calculates that he is saving 50 per cent. of the stokers wages in the portion of his works at present served by the machine, and he estimates that the economy will be increased, as the use of the machine is extended, and a proper organization introduced. Our readers will see that nothing new is required but a good head of water, which can be easily obtained by putting a large tank above the roof of the retort-house. We may mention here, in answer to ourselves, that the quantity of water expended in drawing and charging each retort is only about a cubic foot—a quite insignificant amount—the greater part of which, however, may be saved by the arrangements suggested by Mr. Foulis. We shall be greatly astonished if these machines do not immediately supersede all other appliances for mechanical stoking.

The quarterly report of Dr. Letheby again shows that the metropolitan gas companies well keep up the illuminating power of the gas they supply, and that improvement is being made in sulphur purification. We now hope that the companies coming under the last regulations of the referees will be able, during the summer months, to keep under the maximum of 25 grains.

The history of the Patent Gas Company, which we some time ago desired to see, has been written; not, indeed, quite so fully as we could have desired, but still with details which leave but little for the imagination of the reader to fill in. At the annual general meeting of the company, held on March 4th, a committee was appointed to investigate "the inception and affairs of the com-"pany," and to report to the adjourned meeting to be held on the 14th inst. A meeting was held on the last-mentioned date, and the report was presented, having previously been circulated among the shareholders. To call the proceedings at the meeting "stormy," would give the reader but a faint idea of the scene, and the expressions made use of by some of the speakers. An answer to the report of the committee, in the form of a letter to the shareholders, has been published by Mr. W. Price, and from these two documents we propose to compile a succinct history of the company.

Dr. Eveleigh's first patent, it will be remembered, is dated Jan. 7, 1869, and from that date we may suppose him busy with negotiations for the sale of it, for early in June, 1870, we find him dealing with Mr. W. R. Price, for the sale of one-ninth share of the patent for the sum of £300. The completion of the purchase was contingent on a favourable report on the process from Mr. Laing, of the Independent Gas Company. Mr. Laing, however, did not make a satisfactory report, and the negotiation fell through. Then, towards the end of June, a company was projected to take over the whole of the patent. The company was registered on Sept. 1, 1870; and the first meeting of directors was held on the following day. At this meeting an agreement made with Dr. Eveleigh for the purchase of the patent, the consideration being 10,800 fully paid shares (of £1 each), was confirmed; and it was resolved to issue a prospectus. We need not here quote the promises of the prospectus, which was never adver-

tized, and only privately circulated. The first issue of shares was 12,500, of which it will be seen only 1700 remained for private subscription. The first allotment was made on Sept. 13, 1870, and between that date and Jan. 10, 1871, the whole 1700 were taken up, Dr. Eveleigh himself subscribing for 500. On Jan. 18, 1871, the purchase from Dr. Eveleigh was completed, and 10,800 shares handed to him. On the same day the doctor divided 5600 shares among those who had assisted in the formation of the company, the consideration appearing in the transfers, being an average price of 3s. 3d. for each £1 share. We are not much concerned with the personal history of the company, but a few of the transfers may be quoted from the report:—

Transferor.	To whom Transferred.	Number of Shares.	Consideration in Transfer.
G. Eveleigh. ..	W. R. Price. ..	650 ..	£0 5 0
,, ..	John Ogle. ..	1550 ..	350 0 0
,, ..	E. V. Hartmont. ..	800 ..	200 0 0

On the same day, Mr. Ogle transferred to various persons 395 of his shares, the consideration in each case being 10s. per share. An extraordinary meeting of shareholders was held on March 14, 1871, at which the chairman (Mr. J. Ogle) reported that experiments of a most satisfactory nature had taken place at the works at Peckham, under the observation of several authorities, and the directors were authorized to make a further issue of 2500 shares. These were allotted between March 14 and Aug. 23, 1871. Immediately after the close of this allotment, "a sudden inquiry" for the shares arose, and the £1 shares soon fetched £3. In June, 1871, the directors conceived that the position and prospects of the company would be benefited if they obtained professional assistance in working the process, and they engaged with Mr. T. R. Mellor, who, having satisfied himself of the value of the patent, undertook to act as consulting engineer, in consideration of the annual payment of 2½ per cent. of all net royalties, and, apparently, an equal sum on sales of the patent, with travelling expenses, &c. On Oct. 4, 1871, the directors resolved to issue 15,000 new shares to the shareholders then on the register, share for share. Soon after, rumours got abroad that the company had agreed to sell their French patent for £50,000, and, thereupon, the fully paid £1 shares rose to £14; the shares with 5s. paid, to £6, and "many "hundreds of transfers were passed." A correspondence was actually going on at the time which seemed to promise the sale of the French patent for the price named; but the committee have been at the pains to trace the chief negotiator, and they have found that his communications were dated from a house in Pimlico, where he occupied a bedroom, and from a coffee-shop, which he frequented occasionally. The negotiation, of course, fell through, and an attempt to resume it with a gentleman in Paris was unsuccessful. The statement respecting these transactions made by the chairman of the company, at the ordinary meeting of the company, and that made by the committee in this report, are directly at variance. According to the committee, no deposit, or any payment whatever, was made to the company on account of the intended sale. The chairman is reported to have said that the directors "cancelled the agreement, and had the "deposit money returned." In December, 1871, the directors made the arrangement with the East Barnet Company, "the "object of the board being to make the works such a successful "and profitable undertaking, that it would become a necessity "for all gas companies to take the matter up." All this time speculation in the shares continued, and one principal occupation of the directors was "passing an enormous number of transfers." Thirty thousand shares had been issued, 15,000 of which were fully paid, while on the other 15,000 only 5s. had been paid. The difference caused dissatisfaction among holders of the latter shares, who were naturally anxious to have as much money as possible invested in a concern that promised so well. The directors made a proposal to equalize the value of the shares, but, in the end, it was decided to reconstruct the company. The old company was wound up, and a new one formed, with a nominal capital of £300,000, in £5 shares. Two of these share, each credited with £4 paid, were allotted for each £1 share fully paid; and for each share of the third issue on which 5s. had been paid one £5 share was allotted, credited as before with £4, but subject to an immediate call of 5s. The remaining 5000 shares, in the new company were to be offered to holders of the third issue, in proportion to their holdings, on condition that they paid up the £4 by instalments. We may mention that just about this time Dr. Eveleigh and Mr. Mellor were voted £500 each for services rendered, and the directors were voted £1500. The market price of the shares at this time was £11 15s. We may pass over an abortive attempt to dispose of a licence to work the patent in some small continental towns, and come to the formation of the Petersburg and Viborg Gas Company. This company was formed to work Dr. Eveleigh's patent in Russia, commencing with a suburb of St. Petersburg. The Patent Gas Company took 1000 shares, of £10 each, in the undertaking, and paid £2500 on them. Under the agreement, the Viborg Company were to erect, in the first instance, not less than 50 retorts, and were to pay to the Patent Gas Company a royalty of 3d. per 1000 feet on the gas made. The committee, who issue the report from which we quote, made an attempt to ascertain the actual present circumstances of the Viborg Company; but all they have learned seems to be that nothing has been done in Russia, except getting the concession and the articles passed. In the meantime, they calculate that the company have received £25,000 in deposit and allotment money. The market price of the shares of the Patent Gas Company had fallen a little, but not much, when, in July, 1872, negotiations were commenced with Clews, Habicht, and Co. for the sale of the United States patent for £250,000. It should be mentioned that Dr. Eveleigh had sold half that patent before the company was formed, and this moiety the company now bought back for 833 shares of the company, with £4 paid, the vendor paying £457 in cash. We may pass over the agreement with Clews, Habicht, and Co. for the sale of the American patent, through them, to Mr. Caleb Strong Marshall, and merely mention that while the negotiations were in progress the market price of Patent Gas Company's shares rose to £14 10s. The purchase-money, £250,000, was to be paid in five annual instalments, the first of which was paid by cheque from Clews, Habicht, and Co. about Aug. 6, 1872. On the sum so received, £50,000, Mr. Mellor received his commission of 2½ per cent., £1250. Of the remainder, £42,381 was paid to the shareholders by way of dividend.

Just before the negotiations for the sale of the American patent commenced, a syndicate was formed, to remain in existence three months, for dealing in the shares of the Patent Gas Company. The chief agent in these transactions was Mr. E. V. Hartmont, with whom was associated a Mr. Walker. On the 6th of August, 1872, Mr. Hartmont held no fewer than 11,638 shares, but, as one of the syndicate, he was restricted in his dealings to the 2500 shares he contributed. It was rumoured at the time, and noticed in these columns, that the American transaction was a "bogus sale," and it is a matter of history that, immediately after the payment of the one dividend, the market value of the shares in the Patent Gas Company went down. It is presumable, therefore, that the dealings of the syndicate resulted in a heavy loss. Time wore on, and the date approached (Aug. 6, 1873) for the payment of a second instalment of £50,000. On July 28, the secretary of the company wrote to Clews, Habicht, and Co., reminding them of the fact. The reply was to the effect that the purchaser, Mr. Marshall, had not as yet provided the money, but as soon as he did provide it, it would be paid over pursuant to agreement. It was at the same time suggested that the secretary of the Patent Gas Company should communicate direct with Mr. Marshall, whose address, it was understood, was the Langham Hotel. The secretary accordingly wrote to the Langham, and his communication was returned through the Dead Letter Office. Mr. Marshall had left the hotel, leaving in the books a particular trace of his residence there. Failing the payment of this second instalment, the value of the shares went rapidly down. A little life was given to speculation by rumours of negotiations with the Corporation of Manchester, but nothing was ever done. The rest is soon told. By March 11, 1874, the principal holders of the company had nearly cleared out. Dr. Eveleigh had sold all his shares; Mr. Ogle only held 332; and of the 15,228 Mr. Hartmont once held, he had sold 12,206. The East Barnet experiment, scarcely referred to in this report, had proved unsatisfactory, so nothing remained but for the Committee of Investigation to recommend that the company be wound up voluntarily, that three shareholders be appointed liquidators, and that the liquidators be authorized to take such proceedings, at the expense of the company, against such persons for restitution or punishment as counsel may advise; and further, that steps be taken for winding up the Petersburg and Viborg Gas Company, voluntarily if possible; if not, compulsorily. The last recommendation but one was not agreed to at the meeting held on the 14th inst., the shareholders, perhaps, wisely thinking that it is of no use to throw good money after bad, in the prosecution of people who have only indulged in what, in the neighbourhood of Capel Court, are deemed "legitimate transactions." There is only one other thing to mention. The money received *by the company* from shareholders has amounted to no more than £31,609, while they have received in dividends £42,381; since, however, it is probable that the majority of the present shareholders purchased at a high premium, the loss to them must be enormous. We should apologize to our readers for placing these details before them at so much length, but the story of the Patent Gas Company has a special interest when told in connexion with the histories of the vicissitudes of legitimate gas undertakings recorded in other columns.

WATER AND SANITARY NOTES.

THAT peculiarly busy body, the Society of Arts, have been taking the water supply of the metropolis under their consideration; and when we mention that Mr. Edwin Chadwick was one of the committee appointed to consider the matter, no one will be surprised to learn that the recommendations of the committee involve the absorption of the eight metropolitan water companies by some local authority, or, at all events, that their operations should be directed by some joint authority—a special commission, for example. It would appear, from Mr. Chadwick's address to the President of the Local Government Board, that the officers of two companies—it is not difficult to guess which—are in favour of the change of administration suggested by the Society of Arts. As regards the advisability of a constant supply, all are agreed, and it can be obtained as soon as the householders of the metropolis will set their houses in order. How the £100,000 a year, which it is alleged will be saved by a centralized administration, can be applied to relieve the consumers of water from the expense of altering their house services, we do not readily see, but no doubt it is all clear to Mr. Edwin Chadwick. The attempt of the committee to frighten the people of London by the prospect of such a conflagration as happened at Chicago is well worthy of them. We rather think that Chicago had a constant supply of water at high pressure, which did not, however, in the absence of such an organization as exists in this metropolis, prevent the spread of the fire. We have no fear for London, even under our present undoubtedly faulty water arrangements; but should, nevertheless, be pleased at the introduction of a universal constant supply. The President of the Local Government Board expressed himself against "comprehensive "schemes." An approved metropolitan authority may have the water undertakings, if they will pay for them, and manage them as they please; but save us from a "special commission," with a *doctrinaire* Whig at the head of it.

Dr. Hill, the medical officer of health for Birmingham, has just published his first annual report, and the contents are of considerable interest. It has recently been stated—and, indeed, repeated in the Town Council of Birmingham—that the borough, from being the healthiest of large towns, had become the most unhealthy. Dr. Hill replies to this as follows:—

The annual death-rate per 1000 persons living in the borough for the last eight years is as follow:—

1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.
24·53 ..	24·03 ..	25·6 ..	25·9 ..	23·1 ..	23·00 ..	24·9 ..	23·1 ..	24·8

From which it is seen that during this period the death-rate has in three of the years—viz., 1867, 1868, and 1871—exceeded that of 1873, and that the average death-rate of these eight years is exceeded by the death-rate of the past year by only 0·5 per 1000, a difference so slight as to be largely within the limits of natural variation, and not to require notice, when it is remembered that this year contains 53 instead of the usual 52 weeks, and that the last week was characterized by an exceptionally high death-rate—viz., 34. Secondly, has the town sunk from a high to a low position in the scale of public health among the principal large towns? The following comparative statement, derived from the same source, will be the most complete answer to this question also.

Annual death-rate per 1000 persons living in 1873:—

Average of 18 large Towns.	London.	Norwich.	Birmingham.	Liverpool.	Manchester.	Leeds.	Newcastle.
24·05 ..	22·45 ..	21·57 ..	24·8 ..	25·9 ..	30·17 ..	27·55 ..	29·9

The inhabitants of Birmingham may, therefore, be assured that the sanitary state of their borough is not so bad as it has been described. Dr. Hill goes on, however, to call attention to the fact that zymotic diseases have been more prevalent in Birmingham than in many other large towns, and he fixes at once upon defective sewerage as the cause. The complete sewerage of the borough is therefore recommended, and, as soon as the Town Council are relieved of the obstacles in the way, the disposal of sewage by irrigation. As a palliative, under present circumstances, the adoption of the "pan system" is advocated as the one open to the fewest objections:—

Of all the intercepting systems proposed, the one which best fulfils these (sanitary) conditions is some form of what is called the pail or pan system—its advantages over the common ashpit being, in addition to those above mentioned, that it compels frequent removal, that the act of removal is not offensive, that it renders impossible the leakage into cellars, dwelling-houses, and premises, which is so common in ordinary ashpits or middens, and from the limited size of the receptacles, it admits readily of disinfection being practised; besides which it leaves the manure in a state favourable to profitable employment. The removal as frequently as possible of the receptacles is important, and I think it desirable that the process of mixing the contents with other matters before final disposal to the farmer, should be performed at a distance from populous neighbourhoods.

As regards water supply, Dr. Hill reports that the supply from the water-works "has greatly improved during the last two years," but it "ought to be still further improved by filtration and by the exclusion, wherever practicable, of impurities from the streams from "which part of the supply is drawn." That derived from artesian wells is "perfectly clear and pure." The water drawn from town wells presents a marked contrast to that supplied by the water-works company, the water of all those examined being found to be largely contaminated with dissolved organic matters of the most objectionable type, and only fit for use after having been boiled and filtered. With some trite remarks on ventilation in general, and the ventilation of drains and sewers in particular, Dr. Hill brings to a conclusion a very sensible and not sensational report.

The property of the Balsall Heath Local Board is under "sequestration" by the Court of Chancery, in consequence of the failure of the Board to comply with an order of the court directing them to purify their sewage before it is sent into a stream which feeds the Warwick Canal. Just as in the case of Canton, the suburb of Cardiff, recently referred to, where there is no outlet but the sewers of Cardiff, which are not large enough to carry the sewage, Balsall Heath has, other than this stream, no outlet but through the sewers of Birmingham, and the borough have sewage difficulties enough of their own. The case of the Balsall Heath Board, supposing their representations to be true—and we have no reason to doubt them—is a very hard one, which certainly calls for Government assistance. We see no remedy for this state of things, but the constitution of drainage areas or unions, which we have before suggested; and we hope that the present able president of the Local Government Board will well consider the matter before he or his successor presents, as one or the other must, a Bill for the amendment of the Public Health Act, 1872. Since we have now a tolerably perfect Ordnance map of the country, the difficulty of setting out these drainage unions cannot be great.

While tradespeople are waiting for business, they are ordinarily obliged to live on their capital, but the good people of Sheffield are, at the present moment, much exercised at the circumstance that the Sheffield Water Company are just now paying out of capital "interest on money expended on works not productive of "income and in course of construction." The legal right to do so is not questioned, and that is a practical answer to the objections made. Undoubtedly, the system of paying dividends out of capital is bad, and should be discountenanced as far as possible. On the other hand, the claims of shareholders who have advanced money are not to be disregarded; and it may be added, in this case, that the interests of the water consumers of Sheffield have, up to this time, been but very slightly prejudiced by the action of the company.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

X.

HISTORICAL INTRODUCTION.

(Continued.)

It may be here observed that prior to 1842, and, indeed, for some time afterwards, there existed a great amount of exclusiveness amongst the gas engineers of England and Scotland; but, if we consider the costly means of communication, that railways had only existed a few years, and that the penny postage came into operation about this period, it cannot much be wondered at. There is, however, reason to suppose that our friends in the North, were not more communicative, than the managers of London and other English gas-works, who, as a rule, were exceedingly jealous of the secrets of the gas manufactory being pryed into, so that, (in imitation of the secretiveness observed by the alchymists) all officials, such as clerks, or inspectors, were forbidden to enter any part of the works not immediately connected with their duties.

At the time in question, Mr. Lowe, the engineer of the Chartered Company, made a voyage to Scotland, with the view of examining some of the gas-works of that country, no doubt expecting to find them much inferior to those under his direction. If so, he was greatly disappointed, and the writer remembers perfectly well the expressions of surprise and admiration of that gentleman on his return, when describing the advanced state of the construction, and management of gas-works in Scotland. There, he found the loss by leakage of gas very considerably less than in London—indeed, incredibly small; there, clay retorts were universally employed, whereas they were unknown in England; there, cannel coal was exclusively used, and, of course, very superior gas was produced; and there, instead of the heavy, massive, clumsy fittings of the metropolis, and of England generally, he found the greatest taste displayed in this branch of gas lighting; the fittings, as chandeliers, brackets, &c., as a rule, were light, of excellent design, ornamental, and often even elegant. A Scotch firm was established in London about the same period, and the same style of fittings was introduced into England, amongst them the hydraulic sliding chandelier, which had been in use in Scotland several years previously. From that time, improvements in every possible manner have been generally introduced, the excellence of the designs, and the beauty of the apparatus, being frequently an inducement for the introduction of gas lighting.

Other distinguishing differences, in the operations of the two countries were, that in England the "Argand" burner was universally employed, whilst in Scotland the fishtail or "Scotch burner" alone was used; also that all the Scotch manufacturers of gas-meters made their outer cases of cast iron, whilst by the English makers, they were made of tinned iron. Meters with tinned plate cases were first made in Scotland about 1841.

The state of some of the metropolitan gas companies at this period

(1845) was unfortunate in the extreme, and some facts connected therewith, which came under the writer's notice, may be accepted as examples of the operations of active and ruinous competition as then practised.

As already mentioned, the Equitable and London competed with the Chartered and Imperial Companies in their respective districts; but all the companies supplying a street, or neighbourhood, opposed each other. Oxford Street, Tottenham Court Road, and other large thoroughfares, were supplied by four different companies and from five distinct stations, and speedily afterwards an addition was made to their number. The supply of gas by meters was not at that time general; consumers burned either by contract, or by meter, and the competition was of that nature, that large consumers were taken at ruinous prices, in many instances, so low as not to be equivalent to 2s. 6d. per 1000 feet, when the usual meter price for that quantity of gas was eight shillings. Moreover, this competition created a spirit of insolent independence amongst many consumers, but more particularly those who burned by meter, who changed from one company to another at pleasure, without giving any notice whatever; and when they were refused a supply by one company, either on account of non-payment or other causes, were accepted by another by the payment of a trifling sum; and frequently the inspector, on going to take the consumption, would find his meter displaced, and the premises lighted by another company, and perhaps by contract. All this indicated the worst feeling existing between the rival companies, and was the cause of very serious loss to their shareholders.

For the better facility of carrying on their operations, (as was considered) the rival companies observed the utmost secresy as to the names of their consumers, which was productive of great evil; presenting, as it did, occasions for fraud, which were not lost, either by a few of those in their service, or by a portion of the public. One of the most remarkable acts of dishonesty by the former, was committed by an officer of a company, holding a superior position, who received regularly the quarterly accounts from several consumers, whose names had never been entered in the company's books, and applied the proceeds to his own use. The fraud was eventually discovered, but the delinquent escaped unpunished, and it is to be regretted that various similar acts of knavery occurring at the period could be related.

Amongst the other evils of opposition was the difficulty of distinguishing the pipes of the respective companies. Frequently, in small streets, there were the mains of three companies, all of the same diameter, laid in the centre of the road, sometimes within the space of a yard in width, often crossing and recrossing each other, without any distinguishing mark, and, as the companies had no detailed plan of their mains, it was not possible to distinguish between the one and the other. As a natural consequence, services were frequently laid on to the wrong main; so that one company supplied the gas, and another received the rental. Innumerable cases of this kind occurred.

This disordered state of the opposing companies also enabled an unscrupulous portion of the public to profit thereby. Whether arising from circumstances similar to that related, or from the frequent changes, or other causes, at that time, there were many consumers, amongst them old-established firms of seeming respectability, that had for several years been consuming gas for lighting their premises, without paying one shilling to either of the competing companies. When cases like this were discovered, the matter was compromised, and there was an end of it; for it must be remembered that gas companies at the time did not possess that protection they now have. Burning gas surreptitiously was not then a felony, nor, indeed, amongst the general public (without pretending that the present generation is more virtuous than the former), was it then hardly considered dishonest (let us put it in the mildest form) to burn more gas than was paid for.

However, after having passed years without deriving profits, the opposing companies began to be more reasonable. A meeting of their representatives was held, and, amongst other arrangements, it was agreed that a list of their respective customers should be mutually supplied to each company; and the result of this, was the discovery that many gas consumers had been using that article for years, who had never paid a single gas account. The investigation also led to a knowledge of the confusion which existed with the services, one company supplying the gas and the other receiving the amount; and a rigid examination was forthwith made, each company acting on its own account. To carry out this examination, a novel method was resorted to, for at night, when all the public and private lights were burning, a man was employed to pump at the nearest syphon to the point under examination, so setting all the lights in the neighbourhood, on the company's main under investigation, in that state generally called "jumping." The inspector, being provided with the list of his company's consumers, visited every house, and by this means the errors were discovered; for if, on entering the house or shop of one of his reputed consumers, he found the lights steady, this was sufficient proof that the company he represented was being paid for gas supplied by another; or if, on the contrary, he found the lights on premises not in his list, to be affected by the jumping, then either the consumer paid another company, or perhaps the payment of gas accounts was unknown to him.

This method of jumping the lights led to the prevention of future errors in service-laying, for afterwards, whenever a doubt existed in the mind of the workman as to the proper main to be tapped, he having made a small hole in the supposed main, would light a burner of a known consumer of his company, then, striking the palm of the hand repeatedly and suddenly on the hole, if it were the right main, the light in the consumer's premises would be affected; if it were not, he had to try a second, and sometimes a third main, before being successful.

Other losses of competition arose from the excessive escapes of gas from the mains, for although it was undoubtedly the interest of all parties to correct this evil, the same stubborn spirit of opposition which animated their superiors, prevented the officers of the various companies working together, so that this continuous source of loss was left unnoticed, until at times it became so serious, as to require the interference of the parochial surveyors, and then only were efforts made to effect a remedy. Amongst the incidental expenses of opposition were the repeated opening and repaving of the footways and roadways, for laying services either to private dwellings, shops, or the public lamps, many of the private consumers changing every quarter, and the latter changing about every two or three years; and the necessity of employing three staffs of officers where one would have been sufficient. But the greatest of all losses of this extravagant opposition was the leakage of gas from the mains and services. This, as experience, has since clearly demonstrated, was just in proportion to the rest; the leakage of three competing companies being about three times greater than if the same district had been supplied by one company only.

If we consider, therefore, the large unnecessary capital invested in these opposition companies, the comparatively small rental their ruinous competition realized, the extraordinary loss of gas by leakage, the unnecessary personal expenses, together with the general bad management of some of these undertakings, it is no matter for surprise that they were not successful. Such was the hopeless state of the Equitable Company, at one period, that they offered to sell the whole of their undertaking to the Chartered Company for £30,000, thus presenting a golden opportunity to the latter, which, unfortunately for their shareholders, the directors failed to appreciate. A change took place in the management of the Equitable shortly afterwards, and from that time their career became prosperous.

As another instance of the depreciated state of these undertakings, it may be mentioned that the £50 shares of the London Gas Company, were at one time to be purchased "by cart loads," as stated by a gentleman holding a high position in the gas world, at £2 each; and, so recently as 1852, they realized no more than £2 5s. per share.

Amongst the other excellent opportunities that have been presented to the Chartered Company, we may also state that about 40 years ago the City Company were disposed to sell their works and plant to their rival for the sum of £13,500; a difference of £500 caused the directors of the Chartered to hesitate and delay, and, during this period of hesitation, the City Company had passed the turning-point of their difficulties, when under no conditions could they be induced to dispose of their property. Since then, with some occasional temporary reverses, the company have been all that could be desired.

On the first introduction of meters the price of gas was 15s. per 1000 feet; about the year 1832 this was reduced to 12s., and was gradually further diminished until 1849, when the price charged by all the metropolitan companies for common gas was 6s. per 1000 feet. The high price charged in the earlier periods of gas lighting undoubtedly held out inducements for the formation of rival enterprises, and with what success we have endeavoured to explain; and, as we have likewise shown, the unprofitable and depressed condition of existing companies did not prevent the formation of others. Hence, in 1848, we find another enterprise projected, in opposition to the Chartered and City Companies, to supply the City of London at 4s. per 1000 feet.

With the view of preventing this competition, the old companies, unfortunately for them, somewhat tardily, reduced their price, first to 5s., and subsequently to 4s. per 1000 feet; but, in the meantime, their opponents had gained extraordinary advantages, having presented petitions to the civic authorities, signed by a large majority of gas consumers, praying that the projected company should be authorized to lay their mains within the City to supply the petitioners with gas. This, together with the powerful influence the promoters of the projected company possessed, resulted in the formation of the Great Central Gas Consumers Company.

According to the contract entered into by that company with the City authorities, all their mains were to be laid during the night time, and the paving reinstated by eight o'clock on the following morning. They were, moreover, bound to have the whole laid (upwards of 52 miles), and their works in a condition to supply gas, within nine months of the date of contract. The contractors for carrying out the works were Messrs. Rigby, and the whole was completed, and the company ready to supply, within the prescribed period.

When we consider the various difficulties attending the execution of the works of this company—that land had to be obtained for the site; that the first contractors employed, Messrs. Peto and Betts, abandoned their engagements; that the mains and services had to be laid through a large and crowded district in an almost incredibly short space of time, and during the hours of night—it must certainly be regarded as one of the most remarkable examples of energy, activity, and promptitude in the annals of gas engineering.

At the commencement of their operations considerable doubt existed as to the possibility of the company proving remunerative; but, as they had entered into a contract with their engineer, Mr. Croll, to be supplied with gas, delivered at the consumers meters, at the rate of 1s. 9d. per 1000 feet, success, so far as regarded the company, under the fulfilment of such conditions, could not be doubtful. Contrary to general expectations, the undertaking was commercially successful from the commencement; but the establish-

ment of this company affected very seriously, for some time, the value of gas property, particularly that of the metropolitan companies.

(*To be continued.*)

THE INTERNATIONAL EXHIBITION.

(SANITARY DEPARTMENT.)

First Notice.

A prominent feature of the International Exhibition now open at South Kensington is found in the department in which various exhibits illustrating processes for sewage treatment, and most other matters relating to sanitary improvement, are collected. Opinions greatly vary in regard to the value of the Exhibitions now being held annually in this and other countries. They have, at least, one benefit, which is that the general progress of invention is illustrated for instruction in each branch of art and science, a chance of comparison of ideas on various subjects is afforded, and, consequently, general progress in, at least, manufacturing industry is stimulated. In the present article we purpose confining attention to such chemical methods of treating sewage as either are, or are about to be, exhibited at Kensington. The importance of the subject cannot be over-estimated, for, at the present time, there is scarcely a city, town, or even village, in England that is not actively engaged in devising some plan of treating the sewage, either for the purpose of removing the serious and fatal dangers that have attended its neglect, or are hoping to make the sewage a source of profit, or, at least, to utilize it to an extent that may diminish the cost of operations.

The present modes of dealing with sewage for either of the above purposes may be reduced practically to three—viz., irrigation, filtration, and precipitation. The first method, of course, may be evidently dismissed as not being capable of illustration within doors. The same may be partially said in regard to filtration, except so far as it is combined with precipitation, to which we wish to draw attention, as being the chief subject of illustration at the Exhibition. During the last half century some scores, if not hundreds, of schemes have been proposed to treat sewage by chemical means; but, for all practical purposes, the inventions made, and results arrived at, since, 1854 are alone worthy of remark. But of the great number of patents that have been taken out in this comparatively short period, there are scarcely half a dozen that have survived, and of these it is difficult to say which really carries out the object it professes to attain. The following is a brief account of those which are actually in use in various parts of the kingdom, and which are, or perhaps will be, illustrated in operation at Kensington.

1. *The Lime Process.*—This is the oldest of the chemical processes, and is the one which is now most extensively used. In many of the chemical patents caustic lime is adopted for subsidiary purposes. The lime process, *per se*, is simply the addition of slaked caustic lime to the sewage in various quantities, according to the strength of the latter. The effect is twofold. A precipitate of carbonate of lime is formed, which carries down a portion of the soluble and suspended matters; and, simultaneously, the remaining caustic lime deodorizes the liquid. The precipitated matter is subsequently dried and sold as manure, except in Scott's plan, which will be afterwards fully described. Dr. Bird's process, so long tried in the West of England, is a modification of the lime process. We refer our readers to the report of a paper read recently by Mr. Stephens, given at page 452 *ante.*, giving a full account of the lime process, as now in operation at Leicester.

2. *The A. B. C. Process.*—Next to the lime process, the A. B. C., for the present, occupies the most notable position. It was originated in 1868 by a patent, No. 1954, taken out by Messrs. Sillar and Wigner; but this patent has since been the subject of many modifications and new patents. The original patent included the use of a great variety of substances, but those really essential were—fresh blood drawn from an ox, alum, charcoal, and clay. These were used in variable proportions. The blood, however, bearing only an almost infinitesimal proportion, was yet considered by the patentees as its essential feature. The last modification of the formula (see patent No. 2662, Aug. 3, 1873; and specified, Feb. 6, 1874) gives the following proportions of the mixture, namely:—

Sulphate of alumina	6	parts by weight.
Charcoal	6	„ „
Clay	20	„ „
Blood	¼	part „

These constituents are mixed with water, and agitated with the sewage by suitable mechanical agency. After a very short time, flakes begin to form, the suspended matter rapidly subsides, together with a portion of that held in solution, to the bottom of the vessel or tank, leaving the supernatant fluid clear, tasteless, and inodorous, provided sufficient of the A. B. C. has been added, and other precautions taken. The precipitated matter, after the effluent has been drawn off, is collected, and removed to other vessels to drain off as much liquid as possible. It then forms a mass containing on an average about one part of solid matter to nine of water. Sulphuric acid is added to fix any free ammonia. The mass is then dried and pulverized, becoming a manure sold as *native guano.* Recently slaked lime has been added as an assistant to the precipitating process, when the sewage presents an acid reaction before treatment.

It is, perhaps, as well to remark here that in the present article *we give no opinion on the value of either of the processes* that are described. We simply state facts that have repeatedly been examined by us, or are claimed by the patentees. Hereafter we shall discuss their comparative value.

3. *The Phosphate Process.*—This, with the process next to be described, has been the chief rival of the A. B. C., whether in regard to the purification of the sewage or its conversion into a "valuable" manure. The phosphate process was first brought before the public by Mr. Forbes, about four years ago, at a meeting of the British Association. It essentially consists of the use of a phosphate of alumina, imported from an island belonging to San Domingo. This phosphate is hard, and insoluble in water. It is, therefore, ground, and then treated with sulphuric acid. The chemical changes are numerous, but may be generally stated as producing phosphoric acid in a free state, sulphate of alumina, and, remaining undecomposed or partially decomposed, phosphate of alumina. The resulting brownish-coloured mass is mixed with water, and added to the sewage. But almost at the same time, yet subsequently, milk of lime is added. A new series of chemical and mechanical conditions result; sulphate of lime, with the phosphates, are produced, and the suspended matter is, with a portion of the soluble, precipitated, as in the A. B. C. process. This precipitate is removed, drained, and at last dried, and, on being pulverized, is ready for use as a manure. Its chief characteristic is that of containing a large quantity of phosphoric acid, combined respectively with alumina and lime. If care be taken, an inodorous and tasteless effluent is said to be obtained. The process was at first offered to the Native Guano Company, but on their declining to purchase it, the Phosphate Sewage Company was formed to work it. It may be proper here to name Mr. Whitbread's process, which is similar to the above, except that he uses phosphates of lime obtained from bones, &c., in place of the phosphate of alumina.

4. *Anderson's Process.*—Dr. Anderson, of Coventry, brought out this process about four years ago, and it became the rival of the A. B. C. and phosphate methods. Dr. Anderson uses a crude sulphate of alumina derived from clay, by treating it with sulphuric acid, at the same time producing sulphate of iron, if crude clay be, as usual, employed. This is mixed with the sewage together with milk of lime. The alumina and iron are precipitated, taking down simultaneously all the suspended and a portion of the soluble matter of the sewage. The effluent may be made clear and inodorous. The precipitate is treated as in the A. B. C. process to convert it into manure. This process is being carried out by a company called "The General Sewage and Manure Company." Practically it differs little from the A. B. C. process, except that no blood is employed.

5. *Scott's Process.*—This process, the invention of Major-General Scott, is a modification of the lime process, but its chief feature is that of the final disposal of the precipitate. Lime, or lime and clay, is added to the sewage as received at the works, or during its progress through the sewers. Precipitation occurs as in the methods already explained. After the effluent is run off, the sludge is collected and partially dried in the air. Instead, however, of being converted into a manure (although after subsequent processes it may be applied as such) it is burned to produce a cement. General Scott finds sufficient carbonaceous matter in this sludge, when set on fire, to cause a slow combustion. The result of this is that, while all the offensive matter is burned off, the residue is a compound exactly resembling Portland cement. The peculiar method of producing the precipitate is said to favour the production of the cement, and to give it qualities that the ordinary Portland does not possess. This is due to the exceedingly fine state of division in which the carbonate of lime, alumina, &c., are thrown down during the precipitating process. The cement, however, as it contains certain proportions of phosphates, &c., is available as a manure in cases where carriage to a distance is not necessary. The process is, therefore, proposed to be of local application, both as regards the cement and manure. This and other allied patents are now worked by a joint-stock company.

Such is an outline of the five different processes now in operation, and that have been on public trial, in England, Paris, Berlin, &c., during the last four or five years. Leaving out the lime process, which has been variously adopted at numerous places, the following are the localities in which the remaining four have been, or are now, in operation. The A. B. C. was tried at Tottenham and Leicester, and at last found a temporary resting-place at Leamington—now, however, given up. Works were established at Hastings, Leeds, and Bolton, all still in existence. Experimental works on a large scale were erected at Crossness, but the results were condemned by the Metropolitan Board of Works after a brief trial. The Phosphate Company, after experimenting at Tottenham and Leicester, have erected works at Barking, now in operation. Anderson's process has its localities at Nuneaton and Coventry. General Scott has experimented at Ealing, where works now exist; and he is at present battling with the serious difficulties presented by the sewage of Birmingham.

We must, however, state that none of these companies have yet got beyond the experimental stage, although each has professed to have attained the best results. In future articles we shall carefully investigate the facts which have been furnished to us by each party, give the results of our own experience, and detail the experimental results as afforded by the Exhibition.

It will be also our duty to give particulars of the various Closet Systems, such as of Moule, Goux, Target, and others, as furnished by the patentees, and checked by our own observations.

BERLIN WATER-WORKS COMPANY, LIMITED.—This company is in course of liquidation, the return of capital to the shareholders being at the rate of £20 per £10 share. Great annoyance and inconvenience, however, are being experienced in the winding up, by a ridiculous rule laid down by the liquidators, that every shareholder applying for his money must be accompanied by a "banker, solicitor, notary, or stockbroker." As no attempt is made to identify the "banker, solicitor, or notary," no possible good can result from the rule, and we can only look upon its enforcement as a piece of official impertinence calculated to mar the effect of an otherwise satisfactory close of this great undertaking.

FOULIS'S PATENT MACHINERY FOR DRAWING AND CHARGING RETORTS.

The drawing-machine consists of a malleable iron tube, A, 3¼ inches internal diameter, and of a length depending on the length of the retort to be drawn.*

A piston and piston-rod work in this tube. To the piston-rod, an ordinary drawing-rake is fixed firmly by bolts. This tube is supported on a light angle iron frame, and is hung in the centre on a double joint, so that it may be moved freely in any direction. A four-way stop-cock, C, is attached to the frame, by turning which the water may be passed to either end of the tube. On the spindle of this stop-cock there is a pulley, about 6 inches in diameter, to which is attached a short chain, the other end of the chain being fixed to the end of the drawing-tube. When the stop-cock is turned to the proper position for sending the rake into the retort, the pulley turning with it draws down the end of the tube and elevates the rake (as shown by dotted lines), so that it passes clear over the top of the coke. When the stop-cock is turned in the opposite direction, so as to admit the water to the opposite end of the tube, the rake falls into the coke, and the coke is drawn out, the whole action being very similar to that performed in drawing by hand; the rake being as free to move in any direction in the retort as a hand-rake would be. The operation of turning the stop-cock, and, of course, at the same times of elevating or depressing the rake, may be effected by a hand-lever fitted to the spindle of the stop-cock; but in order to reduce the amount of labour to a minimum, a small cylinder, D, is fixed to the side of the frame, by which the stop-cock is turned, as will at once be understood from the drawings. All the man has to do in drawing the retort is to give a half-inch stop-cock a quarter turn either way, according as he wishes to send the rake into or withdraw it from the retort. A short handle, E, is fixed to the end of the tube, by which the rake may be guided in entering or leaving the retort. A portion of the waste water from the machine passes down into a drain formed in the floor of the retort-house, and goes back to the well to be repumped and again used for driving the machine; while a portion passes by the pipe F to the front of the machine, and is showered down on the coke as it falls from the retort. No more water is, therefore, lost than is necessary to quench the coke. A cylinder, H, is fitted on the machine, for moving it along the house. The water is conveyed to the machine by a flexible tube 1½ inch in diameter, of sufficient length to enable the machine to work through a distance of 60 feet. This tube is attached to the machine by an ordinary bayonet joint, so as to be easily disconnected. Another tube is then connected, and another 60 feet travelled, and so on through the length of the house. Two rakes are shown on the drawing, fixed on one frame, but it is evident that any number may be fixed to one frame to suit the retort-settings.

In working the machine it is found better to send the rake half way into the retort, and draw half the charge, than send it in all the way and draw the remainder. The speed of the rake going into the retort with 70 lbs. pressure is about 8 feet in four seconds, so that, although it has to be sent into the retort two or three times, less than a minute is quite sufficient to draw any retort. It is right to mention that the tube, A, is not bored out, being smooth enough as it leaves the maker's hands.

The charging-machine consists essentially of a cylinder, A, fixed to a frame formed of two I-bars. This cylinder is 6 inches diameter and 3 feet long. A piston-rod passes through both ends of the cylinder, and on each end of the piston-rod there are two pulleys, B B. Round these pulleys a chain is passed, and also round the pulleys, C C. The effect of this arrangement (as is well understood in hydraulic engineering) is to multiply the speed and also the distance travelled by the chain, as compared with the piston. The ends of the chain are passed half round the end of the barrel, D, to which the scoop, E, is attached. This barrel is prevented from turning by a catch. When the water is turned on, the first action is to advance the scoop into the retort; the catch is then released, and the piston, still advancing, turns the scoop. The scoop is then withdrawn by reversing the stop-cock, the catch again released, and the scoop turned back.

It will be observed that the barrel which carries the scoop is supported on two collars, H H. The back collar rests on two small wheels which run on the bottom flanges of the I-bars, while the wheels of the front collar run on the top of the I-bars. The back collar travels with the barrel, while the front collar travels with it until it (the collar) reaches the end of the machine; after which the barrel slides through the collar, as shown by the dotted lines. It will be seen that the effect of this is that, when the scoop is clear of the retort, it rests firmly in the collars; but, when it is in the retort, the collars being close together, and the front collar being free to rise, and also having a slight side motion, allows the scoop to move freely in the retort and accommodate itself to any irregularities. It also renders it unnecessary that the scoop should be a half circle.

The scoop may be filled in many ways, but after consideration it was thought advisable to bring the coals to the machine in boxes, O O O, each containing coals sufficient for one retort. Three or more of these boxes are placed on a small truck or carriage, and brought alongside the machine. On the machine are fixed two light cranes, I I. These cranes are connected together so as to keep the weight parallel to the position in which it is lifted. The chains from these cranes pass round the barrel K, which is turned by a rack and pinion, actuated by an hydraulic cylinder, L. A small cylinder, N, is fixed to the side of the frame, for turning the cranes.

The construction of these coal-boxes will be understood at once from the drawings. The bottom is made to open throughout its entire length. When lifted, the bottom is kept close by the chain, P P. It is then brought over the scoop and lowered on it. The levers, S S, fall into the catches, T T, and when again lifted the chains, P P, are released, the bottom opens, and the coals are left lying in the scoop. It is found as easy to fill these boxes in the coal store as to fill an ordinary waggon or barrow. A cylinder is fixed on the machine, driving the rack and pinion, W, for moving the machine along the house.

All the working parts are attached to the I-bars; when, therefore, it is necessary to charge the top row of retorts, the frame is raised by the hydraulic cylinder, Y, as will be easily understood from the drawings.

The machine shown on drawings is arranged for settings of five retorts in use at Dawsholm works, where the machines are at work; but machines have been designed for settings of seven or nine retorts, or, what will be found less complicated, a machine may be constructed set on a low frame to charge the bottom row of retorts, leaving the machine, as above designed, to charge the two top rows.

The man standing on the platform, U, has the four stop-cocks before him, by which he controls the whole motions of the machine.

The water is conveyed to the machine in the same manner as already described in connexion with the drawing-machine. It was thought at first that some difficulty might be had with these flexible tubes; but on inquiry it was found that they could be got to stand a pressure of above 200 lbs. per square inch, which is far above what is necessary. During the three months they have been at work no difficulty has arisen. The quantity of water required depends on the pressure of the water, because the higher the pressure the smaller may be the cylinders; but in all cases it will be found better to fix a force-pump to the engine of the works, with an accumulator, and run the water back to the well to be repumped. In this way no more water is lost than what is necessary to quench the coke, and a comparatively small pump will be found sufficient. The construction of the machines has been proceeded with very cautiously; and although it is more than twelve months since the patent was applied for, nothing has been said about it until the machine was simplified as much as possible, and practically tested.

By the use of these machines four men can draw and charge 60 single retorts per hour.

The work (especially of the drawing machine) is very easy, and the men can easily continue drawing and charging, without stopping, for two hours; after which it may be necessary to allow the machines to stand for half an hour or an hour for cleaning and oiling, when they will be again ready to go on.

In smaller works two men will be found sufficient to work the machines at the rate of 30 retorts per hour.

Each manager will be able to calculate from this what the saving in his particular case will be.

* By an error of the lithographers, the lower scale on the drawings accompanying this description has been numbered 10 to 50, instead of 1 to 5 feet.

Correspondence.

"LONDON" ARGANDS *v.* SILBER BURNERS.

SIR,—In the last number of your JOURNAL, I find a letter from Mr. Sugg, who, as on a previous occasion he formed an exaggerated estimate of his privileges as an inventor, seems now to have erred in a similar manner with regard to his rights as an inquirer. With your permission, I will remind him of the origin and nature of the correspondence.

At the annual meeting of the Silber Light Company, the chairman (Lord John Hay) told his copartners, the other shareholders, of a certain improvement in which they were interested. The communication, although made public by virtue of the conditions under which such meetings are held, was in its essential nature a private one, and did not at all partake of the character of an advertisement or trade announcement. The time for these had not yet come.

Mr. Sugg, however, not content to wait until something was put before the general public, rushed into print; in reality for the sake of advertising his own burners, but ostensibly in order to maintain that Lord John Hay could not have intended his words to bear their simple, natural, and evident meaning. I rejoined, in effect, that Lord John Hay meant what he said, and nothing else; and I took the liberty of assuring Mr. Sugg that his own burners (with all of which, I believe, I am perfectly well acquainted) have been so much improved upon that they will probably be altogether superseded. Why should this not be true? Mr. Sugg tells us that he has himself recently effected great improvements, and he surely does not conceive that he enjoys any monopoly of the power of doing so. If he can improve, why should not I or another do the like?

It is, I apprehend, quite manifest that I was called upon to correct Mr. Sugg's misrepresentations or distortions of the utterances of the chairman of the company of which I am managing director, and I fulfilled, to the best of my ability, the duty thus imposed upon me; but I fail to see that I am therefore required to answer an avalanche of questions. I have no doubt that Mr. Sugg, as a competitor in trade, would gladly obtain all the information concerning the forthcoming Silber gas-burners for which he asks; but I am constrained to tell him that if he wait he will see. It is no part of my business to minister to his love of knowledge, although I regard it as natural, or even laudable. My burners will be ready for issue about the middle of May, and Mr. Sugg will then, if he pleases, be able to determine for himself their faults and merits.

I may, however, reply at once to two inquiries. Mr. Sugg asks, "What Argand" was taken as the test of comparison? And, again, "What are the ordinary burners here mentioned, and with what quality of gas by the jet photometer or referees standard burner do they give 10 or 12 candle light?" The Argand, taken as the test of comparison, was that described in his own pamphlet, page 14, in the table of experiments made by Mr. Kirkham for the House of Lords, as "Sugg's patent London (24-hole) improved, as made now" (with 24 holes in the cone). The "ordinary burners" are those mentioned in the same table—Nos. 4

to 9 inclusive; and certain details about the experiments will be found in the place referred to.

I regret to learn that I have to apologize to Mr. Sugg for one serious error. I apologize humbly, but must ask leave to explain that I was led into this error—perhaps not inexcusably—by my imperfect acquaintance with the niceties of the English language. I said that he had described a rival trader as "the enemy," but I now find that it was a Moderator lamp to which he applied this expression. I was not aware, when I wrote, that it was proper to attribute passions or feelings, such as enmities, to any but sentient beings; or that a table, chair, lamp, or other utensil, could be an enemy to any one. I am much obliged to Mr. Sugg for the knowledge I have acquired on this point, and will take care to remember it for the future.

I have referred again to the only version of Mr. Sugg's paper now in my possession—that given in your issue of the 21st of October, 1873. I should not have imagined, from the heading there prefixed, that Mr. Sugg's words of wisdom had indeed fallen upon "the ears of the gas managers present;" for the paper is described as having been "*prepared* to be read" at the meeting, and as likely to be published in the "Transactions." Whether actually read or not, it contains a curious mistake that I had overlooked before. Mr. Sugg says that Hinks and Wells's duplex lamps afford a light equal to that of 16 candles, but at a little more than double the cost of 16-candle gas in London! Is it possible he can believe that, light for light, petroleum costs twice as much as gas? And, if it did so, would it be—as it is—an article of constantly increasing consumption? When petroleum was 1s. 3d. per gallon, it could be burnt so as to effect a saving, on the same light, of nearly 40 per cent., as compared with gas at 3s. 9d.; the actual figures being as 61·31 to 100. Petroleum is now quoted at 11d. a gallon, while the price of gas has increased! Mr. Sugg will not allow that his incorrect description of a nobleman is an evidence of general inaccuracy, but we here see the value of his statements about a matter in which even he could scarcely refuse to admit that some approach to truth is desirable. A. M. Silber.

London, April 18, 1874.

HATHAWAY'S PATENT FURNACE.

Sir,—A circular relating to "Hathaway's Patent Furnace" has been sent to gas managers, in which, by a mistake on the part of the person employed by Mr. Hathaway to send out the circulars, it is stated that "Mr. Livesey, of the South Metropolitan Works, London, makes his saving 25 per cent." I have tried one of these furnaces, and found the result sufficiently encouraging to lead me to make further experiments; but I have never said, nor am I yet prepared to say, what advantages may be derived from their use. George Livesey.

South Metropolitan Gaslight and Coke Company,
589, Old Kent Road, S.E., April 20, 1874.

Parliamentary Intelligence.

HOUSE OF LORDS.

Saturday, April 4, 1874.

Petitions against the following Bills were presented:—Alliance and Dublin Consumers Gas by (1) Corporation of Dublin, (2) Consumers of Gas in Dublin, &c.; Beverley Water by (1) North-Eastern Railway Company, (2) Corporation of Beverley; Broadstairs Water (No. 1) by R. Richardson and another; Broadstairs Water (No. 2) by (1) Broadstairs Water Company, (2) Owners, &c., of property in Broadstairs; Dublin Corporation Gas by (1) Dublin and Drogheda Railway Company, (2) Dublin, Wicklow, and Wexford Railway Company, (3) Rathmines and Rathgar Commissioners, (4) Gas consumers, &c., of Dublin and suburbs; Enniskillen Gas by Commissioners of the Borough of Enniskillen; Fairfield Local Board by (1) Midland Railway Company, (2) London and North-Western Railway Company; Hartlepool Gas and Water by North-Eastern Railway Company; Middlesborough Extension and Improvement by (1) North-Eastern Railway Company, (2) Langbaurgh West District Highway Board, (3) Owners, &c., of property in Marton and Langbaurgh West District Highway Board, (4) Owners, &c., of property in Linthorpe, (5) J. B. Rudd, (6) John Harrison, jun., and others, (7) Thos. Hustler; Neath Corporation by (1) Great Western Railway Company, (2) Neath Water Company, (3) Neath New Gas Company, (4) Mary Grant and others; Nottingham Gas and Water by (1) Nottingham Gaslight and Coke Company, (2) Nottingham Water-Works Company, (3) The Duke of Portland, the Earl of Carnarvon, and others; Shipley Local Board of Health by (1) Midland Railway Company, (2) Corporation of Bradford, (3) The Dowager Countess Rosse; Westleigh, Pennington, and Bedford Local Boards by (1) London and North-Western Railway Company, (2) Hindley Local Board; Wrexham Water by (1) Great Western Railway Company, (2) Cefn, Acrefair, and Rhosymedre Water Company, (3) Edward Evans; Ystrad Gas and Water by (1) Inhabitants of Llwynypia, &c., (2) I. H. Insole.

A petition praying to be heard against alteration in the Westleigh, Pennington, and Bedford Local Boards Bill was presented by the Leigh District Gas Company.

Tuesday, April 14.

Neath Corporation Bill.—The Select Committee for the consideration of this Bill, consisting of Lord Hanmer (chairman), Viscount Canterbury, Lord Foxford, Lord Annaly, and Lord Waveney, was appointed to meet on Monday, April 20, at eleven o'clock.

Thursday, April 16.

Gas Orders Confirmation Bill.—A Bill for confirming certaining Provisional Orders made by the Board of Trade under the Gas and Water Works Facilities Act, 1870, Amendment Act, 1873, relating to Burnley, Cork, Glasgow, Paisley, Weymouth, Wrexham, and Southport, was presented by the Lord Dunmow; read a first time; to be read a second time on Monday, April 20.

Friday, April 17.

The Beverley Water, Broadstairs Water (No. 2), Broadstairs Water (No. 1), Wrexham Water, and Fairfield Local Board Bills, were referred to a Select Committee, consisting of Viscount Cardwell (chairman), Earl Onslow, Earl Eldon, Lord Ettrick, and Lord Cottesloe, to meet on Tuesday, April 21, at eleven o'clock.

HOUSE OF COMMONS.

Thursday, April 2, 1874.

Petitions against the following Bills were presented:—Mid-Lothian Water by Edinburgh and District Water Trustees; Musselburgh and Dalkeith Water by (1) Duke of Buccleuch and Queensbury, (2) Trustees and Local Authority of Dalkeith, (3) Lord Provost, &c., of Edinburgh, and Edinburgh and District Water Trustees; Waterford Gas by Corporation of Waterford; Wigan Improvement by London and North-Western Railway Company.

Saturday, April 4.

Petitions against the following Bills were presented:—Wakefield and District New Water by Corporation of Rotherham; Wigan Improvement by Ralph Darlington.

Thursday, April 9.

A petition for dispensing with Standing Orders 110 and 130 in the case of the petition of the Corporation of Rotherham against the Wakefield and District New Water Bill was presented by William Whitfield.

Requisitions to withdraw petitions against the following Bills were lodged:—Edinburgh and District Water, from Corporation of Leith; Wakefield Water, from promoters of Wakefield and District New Water Bill, and others.

Monday, April 13.

The following Bills were read a second time:—Waterford Gas; Musselburgh and Dalkeith Water; Peterborough Gas.

Municipal Corporations (Borough Funds) Act, 1872.—A petition for alteration was presented by the Corporation of Brighton; and one for repeal by the Corporation of Dewsbury.

Waterford Gas Bill.—A petition for dispensing with Standing Orders 110 and 130 in the case of the petition of the Corporation of Waterford was presented from Messrs. Holmes, Anton, Greig, and White.

Tuesday, April 14.

The Aberdare and Aberaman Gas Bill was read a second time.

The orders "that the Wakefield and District New Water and the South Lancashire Water Bills be committed" were read and discharged. Bills withdrawn.

The following resolutions of the Standing Orders Committee were reported and agreed to:—"That, in the case of the Shipley Local Board of Health Bill (Lords), the Standing Orders ought to be dispensed with;—That the parties be permitted to proceed with their Bill, provided that the powers given to the churchwardens and overseers of the township of Shipley to grant by way of gift to the local board the lands described in Parts II. and III. of Schedule A be struck out of the Bill;—That the committee on the Bill do report how far such order has been complied with on the report of the Bill."

The Tunbridge Wells Gas, Birmingham Gas, Grantham Gas, Peterborough Gas, Ulverston Local Board, Wigan Improvement, and Aberdare and Aberaman Gas Bills were referred to a Select Committee consisting of Mr. Monk (chairman), Marquis of Hamilton, Mr. Onslow, Mr. Henry O. Lewis, and Mr. A. Bonham-Carter (referee), to meet on Wednesday, April 22, at twelve o'clock.

The Lymm Water, Fylde Water, Padiham Water, Horbury Local Board, Truro Water, and Wakefield Water Bills were referred to a Select Committee consisting of Mr. Bathurst (chairman), Mr. A. Bass, Mr. Backhouse, and Mr. Ritchie, to meet on Thursday, April 23, at twelve o'clock.

Wednesday, April 15.

A requisition was lodged by the Barrow-in-Furness Corporation to withdraw their petition against the Ulverston Local Board Bill.

Thursday, April 16.

A petition for additional provision in the Wakefield Water Bill was referred to the Examiner of Petitions for Private Bills.

Reports, that Standing Order, No. 73, has been complied with in the case of Chester Water and Belfast Corporation Gas Bills; laid on the table.

A requisition was lodged by consumers of gas, &c., in Grantham, to withdraw their petition against the Grantham Gas Bill.

Friday, April 17.

Petitions for additional provisions in the Birmingham Gas and Wigan Improvement Bills were referred to Examiner of Petitions for Private Bills.

Report, that Standing Order, No. 73, has been complied with in the case of the Mid-Lothian Water Bill, laid upon the table.

The following resolution, reported from the Standing Orders Committee, was agreed to:—"That, in the case of the Waterford Gas Bill, petition of Holmes, Anton, Greig, and White, for dispensing with Standing Order, No. 130, in the case of the petition of the Corporation of Waterford against the Bill, the said Standing Order ought to be dispensed with."

Municipal Corporations (Borough Funds) Act, 1872.—Petitions for alteration were presented from Wisbeach, Bootle-cum-Linacre, and Salford.

A requisition to withdraw the petition of the Mayor and Burgesses of the City of Waterford, against the Waterford Gas Bill, was lodged.

The Airdrie and Coatbridge Water, as an unopposed, Bill, was referred to a committee, consisting of the Chairman of Ways and Means, Sir Edward Colebrook, and Mr. Rickards (referee), to meet on Thursday, April 23, at twelve.

Saturday, April 18.

A petition against the Wigan Improvement Bill was presented by the inhabitants and ratepayers of Pemberton, for the insertion of clauses, the petitioner not praying to be heard.

A requisition was lodged by the London and North-Western Railway Company to withdraw their petition against the Lymm Water Bill.

Hull Gas Supply.—The report of Mr. Baynes states that the mean illuminating power of the gas sent into the Myton and Sculcoates district during March, by the British Gas Company, was a little over 16 candles. No traces of sulphuretted hydrogen or free ammonia were at any time present to the ordinary tests. The results for the month are:—

	Max.	Min.	Mean.
Illuminating power standard sperm candles	17·33	15·35	16·14
Grains of sulphur per 100 feet.	33·50	18·80	28·16
Grains of ammonia per 100 feet	—	—	·40

Mean barometer and temperature in experiment-room:—Bar., 30·29; tem., 54°.

The Institution of Civil Engineers.—At the meeting of this society, on Tuesday, April 14—Mr. T. E. Harrison, Aresident, in the chair—Mr. Henry William Pearson, assistant-engineer, Bristol Water-Works, was elected an associate. The president will give a *conversazione* in the west galleries of the International Exhibition on Tuesday, May 9, Her Majesty's Commissioners having kindly placed the picture galleries and the machinery court at his disposal on the evening of that day. Models of engineering works and recent scientific inventions will be transferred from other parts of the building, and these will be supplemented by a few similar objects specially lent for the occasion.

Constant Water Supply in the Metropolis.—The East London Water Company have just issued notice to the water consumers of East London, intimating their intention to lay on a constant supply within certain prescribed limits in the course of May, June, and July. The supply will be given to houses situated within Bethnal Green, Whitechapel, Shoreditch, Spitalfields, Old Artillery Ground, and Bishopsgate. On and after the 1st of May, that part of the district bounded by an imaginary line drawn down the centre of Bethnal Green Road, Brick and Brown Lanes, Spitalfields, and Lamb Street and Spital Square, and High Street, Shoreditch, will have constant supply. On and after the 1st day of June the district south of the above, and bounded by Whitechapel Road, will also have a continuous supply; and on the 1st day of July the district west of the above, and bounded by the City, will be similarly circumstanced.

Legal Intelligence.

LIVERPOOL SPRING ASSIZES.—Wednesday, April 8.

(*Before Baron* Amphlett *and a Special Jury.*)

THE MAYOR AND CORPORATION OF MANCHESTER *v.* CRIPPIN.

Mr. C. Russell, Q.C., Mr. R. G. Williams, Q.C., and Mr. Hopkinson were counsel for the plaintiffs; and Mr. Holker, Q.C., Mr. Herschell, Q.C., and Mr. Edwards appeared for the defendant.

This was an action to recover compensation for the breach of a contract to supply a large quantity of gas coal. In was stated, on behalf of the plaintiffs, that under the Manchester Improvement Act, 1851, the Corporation of Manchester had power to carry on the business of a gas company. In the course of that business they had, of course, to make contracts in advance for the supply of a large quantity of coals. In March, 1872, Mr. Peacock and the defendant having had some negotiations, the Gas Committee authorized Mr. Peacock to enter into a contract with Mr. Crippin, by which the latter was to supply them with 54,000 tons of Bryn gas coal at 10s. 5d. per ton delivered at the Gaythorn station, and 10s. 10d. per ton at the Rochdale Road station, less 1½ per cent. discount. The clause contained the usual clause for accidents and break-downs, and the coal was to be delivered in quantities of 300 tons a week from the 1st of April to the 1st of October, and 400 tons a week from October to April following. This was accepted by the defendant, and was afterwards confirmed by the Gas Committee. The committee were very much in need of coal, and were relying upon a strict fulfilment of the contract in question, but they were very early disappointed. The supply, instead of being at the rate of 300 tons a week from the 1st of April, was very much short of that. In fact, on the 4th of April the defendant delivered only 22 tons; on the 11th, 46 tons; on the 18th, 54 tons, after which there was no further delivery till the 16th of May, when 143 tons were delivered; on the 23rd of May, 62 tons; then there was no delivery till the 6th of June, when 15 tons were delivered. Then there was a great break, for there was no delivery from June 6, 1872, till March 6, 1873, when 16 tons were delivered; and on the 13th of March, 29 tons; on the 20th, 63 tons; on the 27th, 48 tons. From the date of the contract till the 8th of June, the defendant had delivered only 345 tons 13 cwt.; from that date till March 6, 1873, there was no delivery at all, and then from that time to the 27th of May the defendant had only delivered 1152 tons 19 cwt. If the coal had been delivered week by week, according to the contract, up to the time when the writ was issued in October, 1873, he ought to have delivered 27,800 tons, but in point of fact he had only delivered 1409 tons. The plaintiffs contended, therefore, that they were entitled to damages in respect to 52,591 tons. Not being able to obtain coals from the defendant, the corporation were obliged to go into the market and buy others, for which they had to pay as high as 22s. per ton. Under these circumstances they felt bound, in fulfilment of their public duty, not to put up with such a flagrant breach of contract as that of which the defendant had been guilty, and they therefore brought the present action to recover compensation for the loss which they had sustained.

On behalf of the defendant, it was contended, first, that the contract was not binding, inasmuch as it did not bear the seal of the corporation; and, secondly, that the contract was subject to the condition that the coal in question was to be procured from a portion of the mine across a "fault," and that the defendant was not to be required to supply the same if it could not be got across the "fault." Coal could not be got across the "fault," and therefore the defendant maintained that he was released from compliance with the contract; but the existence of this condition and the allegation that coal could not be got across the "fault" were denied on the part of the plaintiffs.

Mr. *Peacock* having been called to speak to the making of the contract,

His Lordship suggested a reference of the case; whereupon a consultation took place.

Mr. Williams subsequently intimated that they had agreed to a verdict for the plaintiffs for £6000, it being intimated by Mr. Holker that this was with the understanding that the contract should be considered at an end.

VICE-CHANCELLOR'S COURT.—Wednesday, April 15.

(*Before Vice-Chancellor* Bacon.)

WARWICK AND BIRMINGHAM CANAL COMPANY *v.* THE BALSALL HEATH LOCAL BOARD.

Mr. Kay, Q.C. (with whom was Mr. Speed), said that in this case he had to move for the sequestration of the property of the defendants, the Balsall Heath Local Board of Health, the defendant Burman being their secretary. In November, 1872, the court granted an injunction against the local board, restraining them from continuing to send their sewage into Sparkbrook, and thereby into plaintiffs canal. Since that time the defendants had done little or nothing to remedy the nuisance. There was, however, evidence that they had spent about £305; but it appeared that all they had done with it was to divert the sewage water of the district, and the nuisance, to remedy which the injunction was granted, remained in full force. And, moreover, pressure had been put upon the plaintiffs by adjoining owners of property. In August last, the plaintiffs had received from the trustees of the Bluecoat Charity, in Birmingham, who owned property adjoining the feeder to their canal, notice to cease to pollute the water. Under these circumstances, as the defendants had treated the injunction as a dead letter, he asked for a sequestration against them.

Mr. Chitty, Q.C., who appeared for the Balsall Local Board, said they had been doing all they could since the injunction. The sewage problem was admittedly a difficult one, and it was not surprising that a small body like his clients had been unable satisfactorily to solve it. Their case was exceptionally hard, as they had to receive the sewage of the King's Norton district, and pass it on. It was clear, upon the evidence, that the defendants had been doing their best to comply with the injunction. They had established filtering-beds at some expense, and had thereby taken no less than ten tons of solid matter a week from the sewage. They had, therefore, purified the water to a great extent, and it was only at flood times that any nuisance was now perceptible. He was aware he was appealing to the mercy of the court, but he would ask what would be the use of sequestration to the plaintiffs? Its only effect would be to paralyze the efforts of the defendants to comply with the order of the court. He submitted that the application should be refused.

The Vice-Chancellor said it was clear upon the evidence that the nuisance was still unabated. That being so, the plaintiffs were entitled to a sequestration against the defendants property, and if they insisted upon it, it must be granted.

Mr. Kay, Q.C., said that he was quite willing to suspend the operations of the sequestration for two months, to give the defendants further time. The defendants, of course, would pay the costs of the motion.

Explosion of Gas on Shipboard.—On the evening of Tuesday last, about five o'clock, a terrific and fatal gas explosion took place on board the Spanish brigantine *Johanna Mathilda*, Captain Niels Olsen, lying off the Mill Dam, south side of Shields Harbour. The vessel was laden with gas coal ready for sea, bound for Riga. The hatches were battened down, and the crew were engaged cleaning the decks for sea, when the after part of the hold suddenly exploded, shattering the decks and destroying the cabin and cookhouse. Olaf Olsen, the mate, was blown into the air and killed instantly, and three others of the crew were severely injured.

Miscellaneous News.

GAS AND WATER WORKS FACILITIES ACT, 1870, AMENDMENT ACT, 1873.

Southport (Corporation) Gas.

The Board of Trade, acting upon the report of Mr. G. A. Vernon Harcourt, the commissioner appointed to inquire into the application of the corporation of this borough, issued, on the 13th inst., an order to amend the Southport Improvement Act, 1871, with respect to the maximum price of gas and the illuminating power thereof.

By the second section it is provided that the order shall take effect from the 15th of April, and shall continue in force until the 29th of February, 1876.

By clause 4 it is provided that from and after the commencement of this order, and during the continuance thereof, section 30 of the special Act shall be read as if the words "four shillings and threepence" were inserted therein, instead of the words "four shillings."

Clause 5 provides that, from and after the commencement of this order, and during the continuance thereof, section 35 of the special Act shall be read as if the words "eighteen sperm candles" were inserted therein, instead of "twenty sperm candles."

METROPOLIS GAS SUPPLY.

Dr. Letheby, the chief gas examiner appointed by the Board of Trade, has recently submitted his quarterly report on the quality of the gas supplied during the months of January, February, and March last, by the Chartered, the Imperial, and the South Metropolitan Gas Companies, from which it appears that the maximum, minimum, and average illuminating power of the gas at the different testing-places has been as follows:—

Illuminating Power in Standard Sperm Candles.

	Company, Kind of Gas, and Testing-Place.	Max.	Min.	Aver.
Imp. Chartered Com. Company	Common gas, Beckton	18·7	15·9	17·31
	" Cannon Street	17·8	16·4	17·01
	" Friendly Place	17·8	16·3	17·38
	Cannel gas, Millbank Street	22·9	20·0	21·45
	" Ladbroke Grove	22·9	19·6	21·50
	Common gas, Carlyle Square	17·5	15·8	16·81
	" Camden Street	17·1	14·3	16·04
	" Graham Road	19·0	14·6	16·61
	South Metropolitan Company, Hill Street	17·5	14·5	16·27

These results show that the average illuminating power of the gas has been fully equal to the requirements of the Acts of Parliament.

As regard impurities, Dr. Letheby reports that the gas of all the companies, at all the testing-places, has been constantly free from sulphuretted hydrogen, and that the maximum, minimum, and average amounts of sulphur in the gas at each place have been as follows:—

Grains of Sulphur per 100 Cubic Feet of Gas.

	Company, Kind of Gas, and Testing-Place.	Max.	Min.	Aver.
Imp. Chartered Com. Company	Common gas, Beckton	26·9	9·3	13·67
	" Cannon Street	22·3	10·2	14·00
	" Friendly Place	16·6	5·3	11·02
	Cannel gas, Millbank Street	27·6	19·3	23·54
	" Ladbroke Grove	24·3	10·4	16·67
	Common gas, Carlyle Square	32·7	10·7	17·95
	" Camden Street	28·2	13·0	20·68
	" Graham Road	25·4	7·8	19·86
	South Metropolitan Company, Hill Street	34·0	16·0	26·93

The gas at Beckton contained an excess of sulphur on one occasion. The same was the case with the gas at Carlyle Square, while that of the South Metropolitan Company, at Hill Street, Peckham, contained an excess of this impurity on nine occasions. Most of these have been the subject of appeal in accordance with the provisions of the Acts of Parliament, and, on inquiry, the chief gas examiner reports that they were due to unavoidable and accidental causes. The proportion of ammonia in the gas has not exceeded the prescribed quantity at any of the testing-places but one. At that place (Ladbroke Grove) the cannel gas of the Chartered Company has been overcharged with ammonia on 19 occasions.

Metropolitan Board of Works.—At the meeting on Friday last, a letter was received from the gas referees, stating that since issuing their notification for the summer half year, 1874, they had been informed that the Chartered Gas Company do not intend to manufacture gas at Horseferry Road during that term, and for that reason the testing-place at 17, Arundel Street, Haymarket, might be closed till further notice.

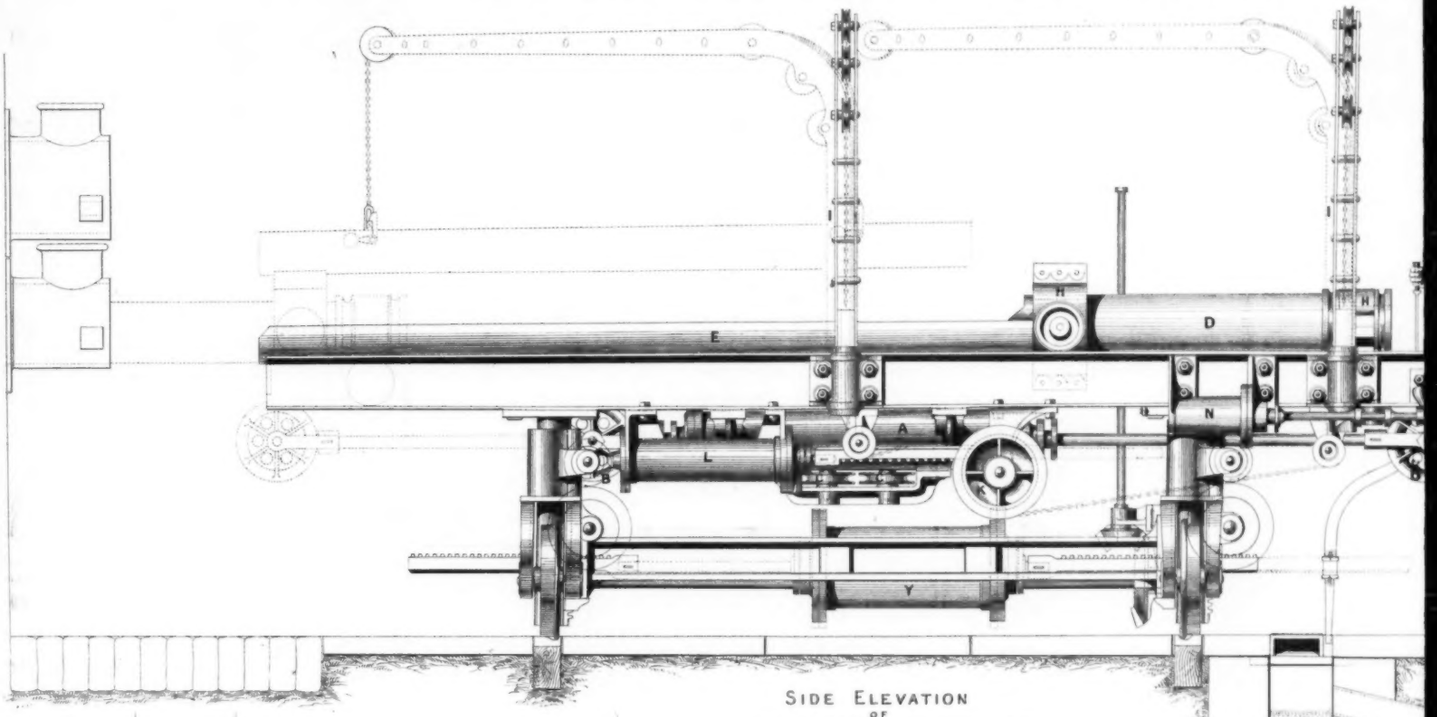
The Gas Agitation.—The *Metropolitan* says: "In all parts of London great dissatisfaction continues to be expressed at the decision of the referees, and the occasion is seized upon by several parties to carry on their little business of trying to relieve the gas consumers of their troubles and their superfluous cash at the same time. Mr. Side, of Southwark, writes to caution the public of Southwark against the marauding influence of sundry gentlemen in white chokers, who are going about saying they represent the Southwark Gas Consumers Protection Association, of which he and Mr. Haynes are the guardian angels; and in other parts of the metropolis we hear of visits to complaining gas consumers from these clever philanthropists. We note that at a meeting held in Clerkenwell during the past week it was stated that the Lord Mayor had consented, in conjunction with Sir Charles Dilke, to introduce into the House of Commons a bill for the formation of a gas board, to be composed of members elected directly from the ratepayers, for the management of the gas supply. We do not know what Sir Charles Dilke may have promised, but we do know most positively that the Lord Mayor has not made any such promise, nor is he likely to do anything of the kind. His lordship's experience as a member of the committee upon the City of London Gas Bill, 1868, made his lordship fully acquainted with the proceedings of gas agitators, and he is not likely to lend himself to any attempt on the part of schemers to trade or make a profit out of the wrongs of the gas consumers of the metropolis."

Holborn.—The Works Committee of the Holborn District Board reported at their meeting, on the 13th inst., that they had considered the letter from the Paddington Vestry on the subject of the Metropolitan Board of Works purchasing the interests of gas companies; and while regretting that the price of gas was raised, they could not support the proposal of Paddington. The report was adopted.

Fulham.—At the meeting of the District Board, on the 8th inst., the committee reported that they had considered a letter from The Gaslight Company, stating that they intended to discontinue the supply of cannel gas and substitute common gas, and recommended that the company be instructed to alter the street burners. The committee also recommended the board to co-operate with Paddington Vestry in their proposal that an application should be made to Parliament for powers to purchase the gas company's works, but it was not adopted.

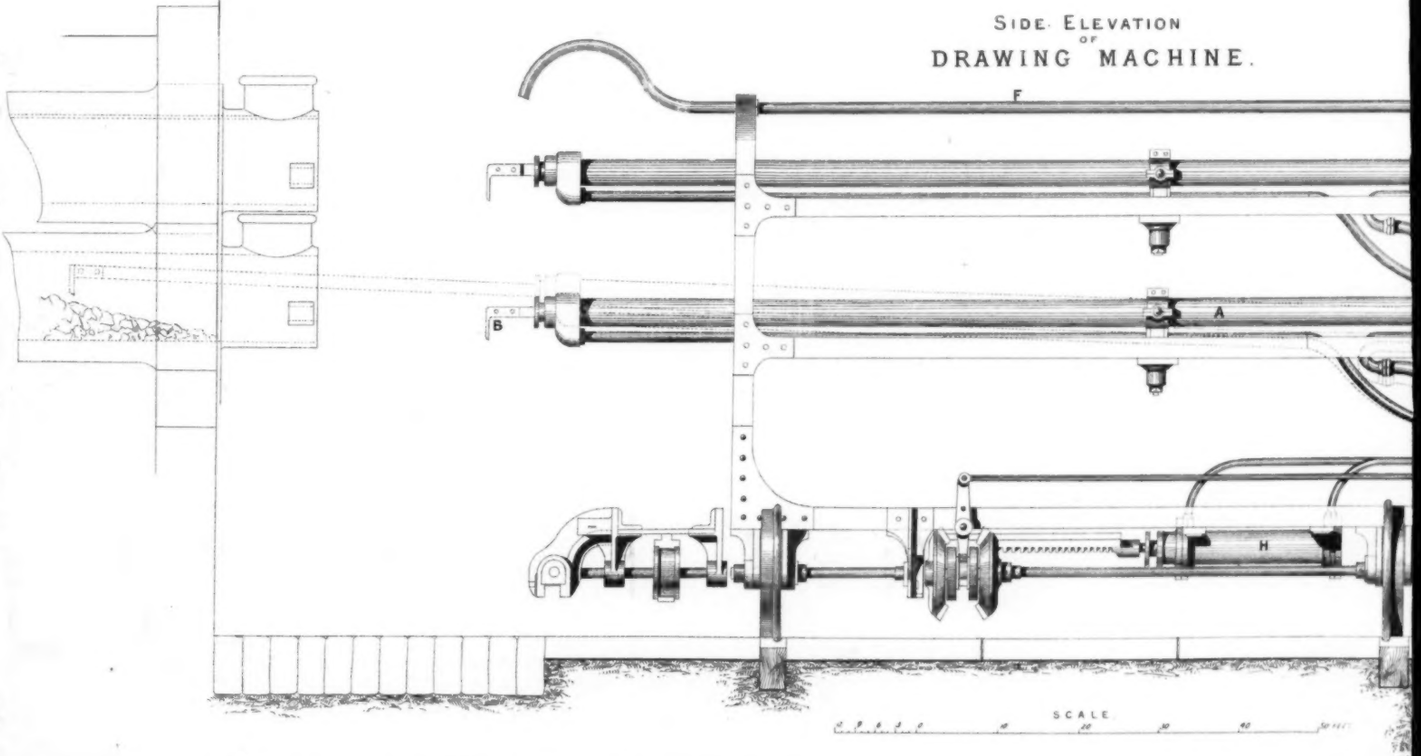
Hackney District Board.—At the meeting, on the 10th inst., Mr. Cox asked whether the meeting was prepared to consider the letter from the Paddington Vestry, proposing that the Metropolitan Board should take power to purchase the plant and property of the several gas companies of London? If so, he was prepared with a resolution on the subject. The chairman observed that Mr. Runtz, their representative at the Metropolitan Board of Works, had expressed a desire to be present when this subject was discussed. He would, therefore, suggest that due notice be given of the consideration of the subject. Mr. Cox thereupon gave notice of his intention to move, at the next meeting, that, in the opinion of the board, the provisions of the City of London Gas Act

FOULIS' PATENT HYDRAULIC STO



SIDE ELEVATION
OF
CHARGING MACHINE.

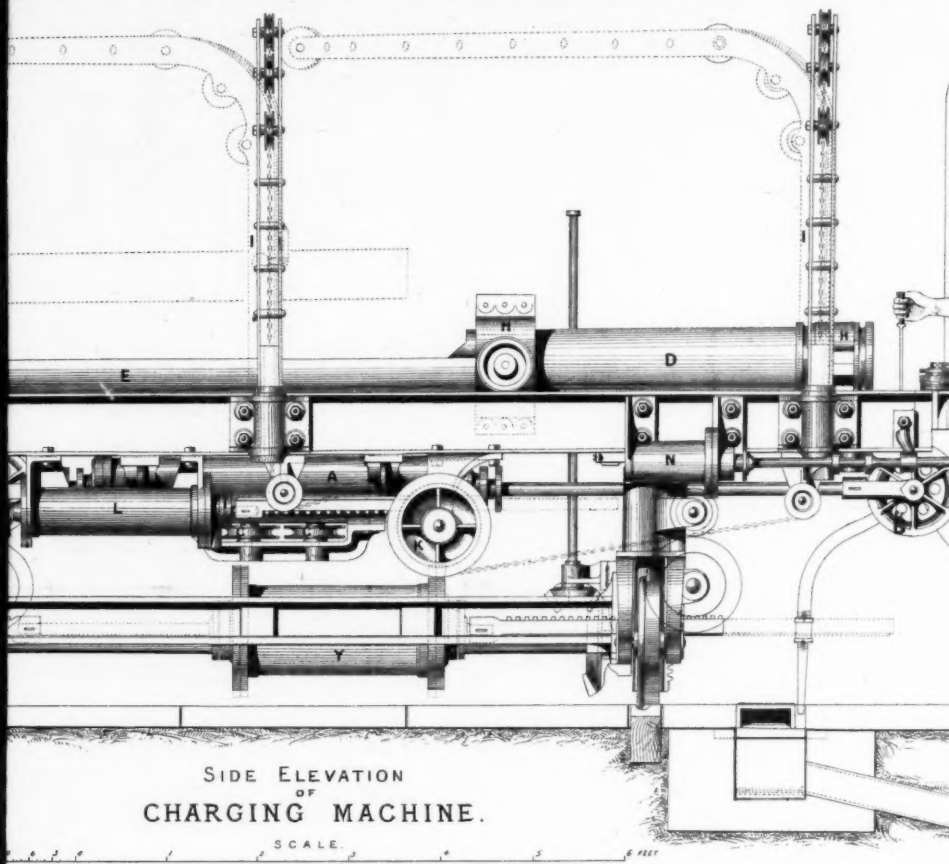
SCALE



SIDE ELEVATION
OF
DRAWING MACHINE.

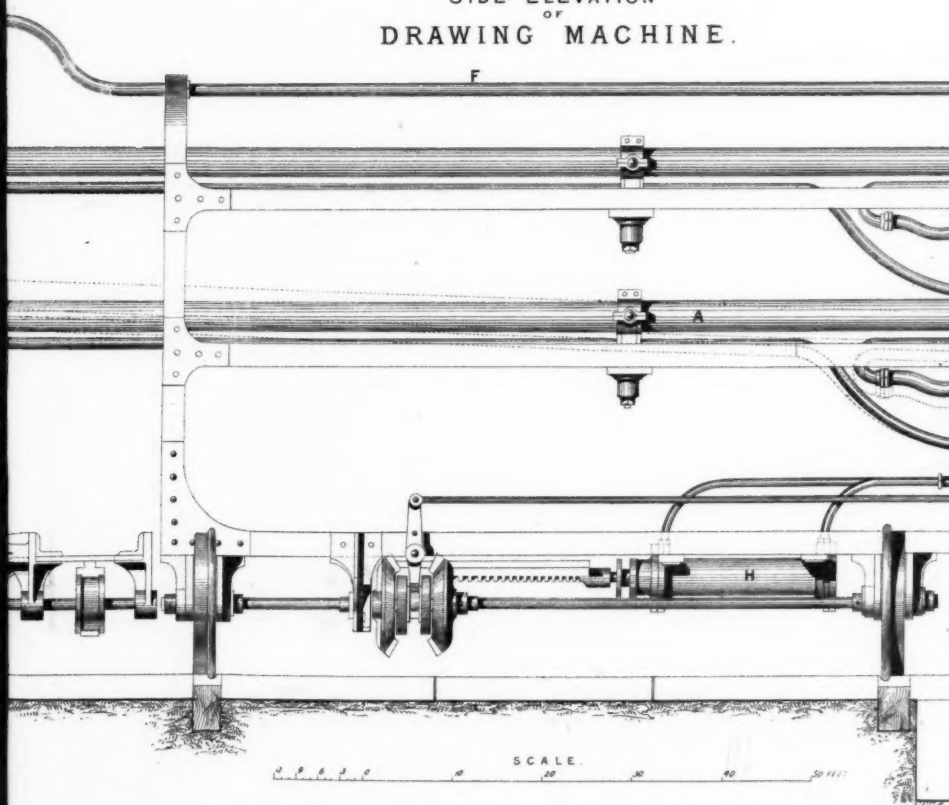
SCALE

...IS' PATENT HYDRAULIC STOK...



SIDE ELEVATION
OF
CHARGING MACHINE.

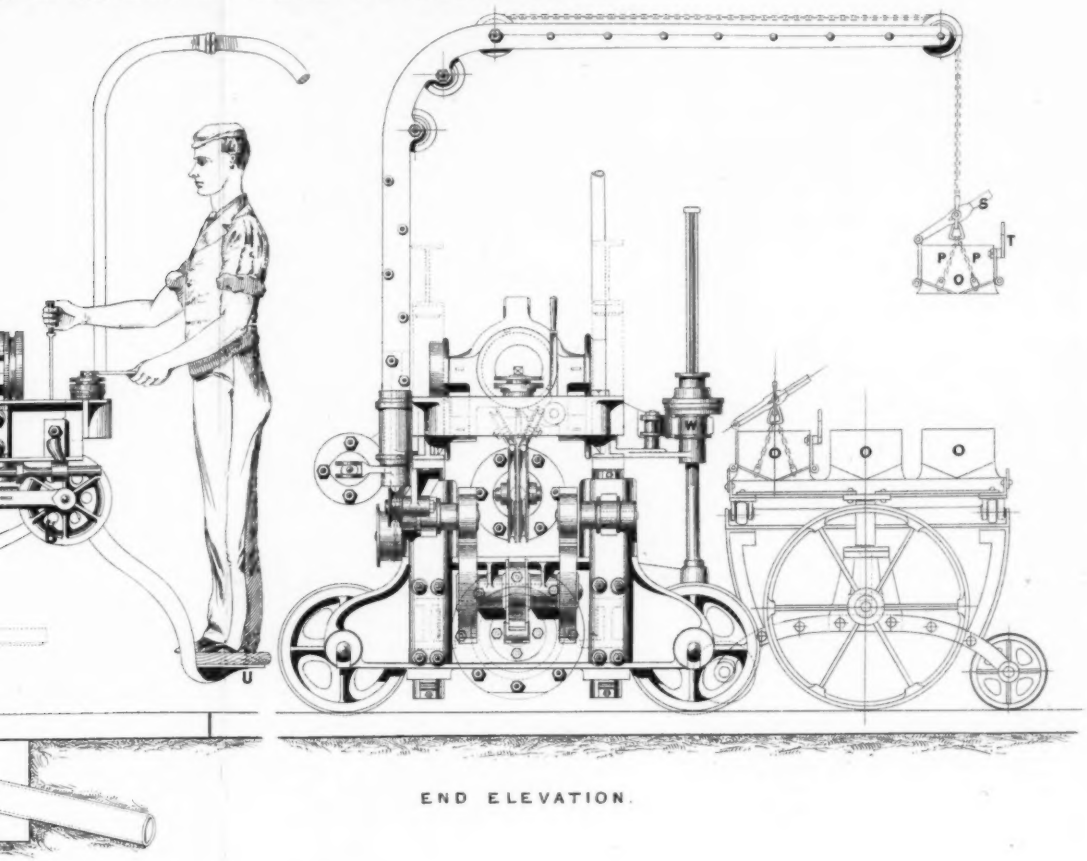
SCALE.



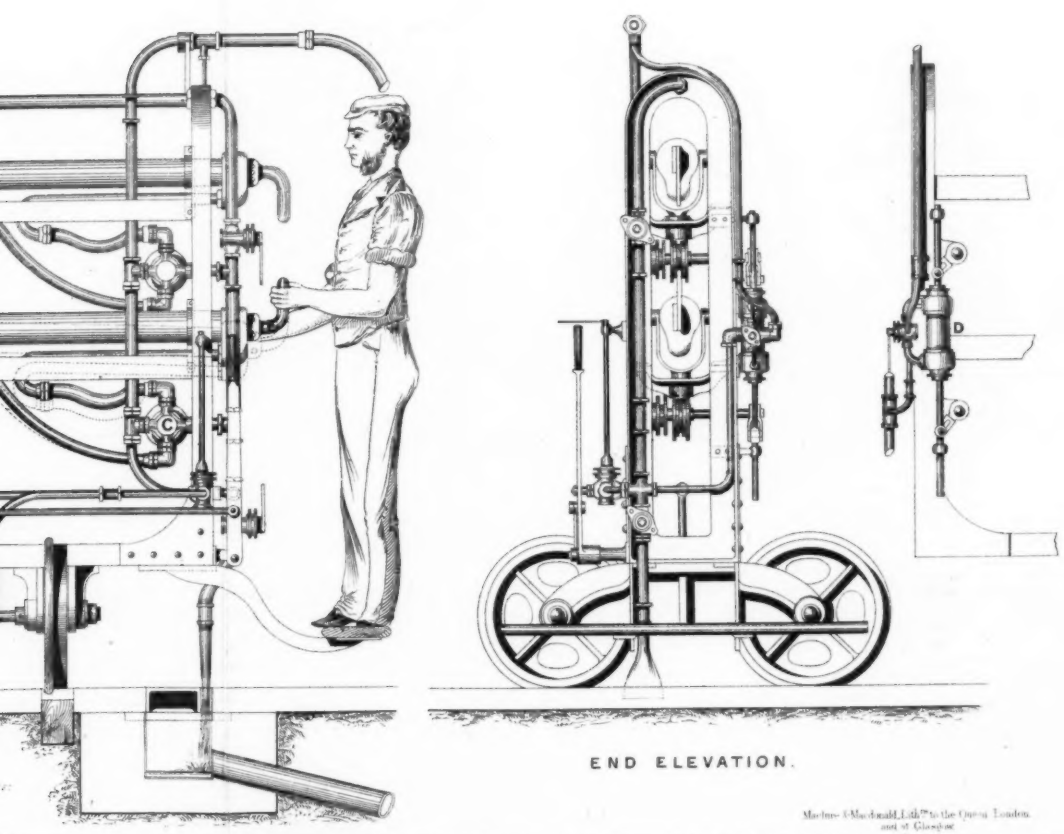
SIDE ELEVATION
OF
DRAWING MACHINE.

1874.

TOKING MACHINE.



END ELEVATION.



END ELEVATION.

Macfarlane & Macdonald Lith.rs to the Queen London and at Glasgow

of 1868 are arbitrary and oppressive, and that they do not afford sufficient protection to the consumers. Further, that this board is desirous of co-operating with the various local bodies of the metropolis, with a view to relieve the ratepayers from the burden complained of, and that a copy of this resolution be forwarded to the Paddington Vestry.

CLERKENWELL VESTRY.—At the meeting, on the 16th inst., a deputation from a meeting of consumers, held at the Crown Tavern, Clerkenwell Green, attended to request the vestry to convene a meeting at the Parochial School-rooms, Amwell Street, to give an opportunity to the ratepayers to consider the question of buying up the gas companies. One member of the deputation said the persons who constituted the meeting at the Crown Tavern were able and willing to pay the cost of convening a public meeting at the parochial schools, but if they did so they would be looked upon as "agitators." The deputation represented large consumers of gas, and they asked the vestry, as the local representative body, to call the meeting, as they would have more weight and influence. The chairman told the deputation that the vestry would consider their request, and they then retired. A motion was then made to empower the parliamentary committee to call a meeting as requested, but, after some discussion, the motion was withdrawn, it being understood that the vestry had no power to grant the use of the parochial schools, as that right rested with the churchwardens. The mover said he would advise the deputation to memorialize the churchwardens to call the public meeting desired. The chairman said, on the part of himself and colleague, he might state that as soon as they received the memorial they would call the meeting. The clerk read a letter from the Paddington Vestry, inviting co-operation in promoting a bill empowering the Metropolitan Board of Works to buy up the several gas companies in the metropolis. It was thereupon moved that the consideration of this letter be adjourned until after the public meeting was held, but some members objected, on the ground that it would be derogatory to a public body like the vestry to await the decision of any public meeting before they gave their decision. On the question being put, the voting was equal, 11 voting for and 11 against the motion, and the chairman gave his casting vote in its favour, and declared it carried.

ST. JAMES, WESTMINSTER.—At the meeting of the vestry, on the 16th inst., Mr. Downes moved—"That, in the opinion of this vestry, the late inquiry by the commissioners into the price of gas was not just to the consumers, inasmuch as it left out a large amount of stock which the commission was not allowed to investigate." It had been suggested that this subject should be referred to a committee, which, upon reflection, he was inclined to adopt, on account of the gravity of the question. Mr. Bidgood said the question was whether the vestries should allow themselves to be charged with all the costs the gas companies had incurred during the past few years. In the parish, he considered the £50,000 which had been laid out in the distribution of gas was an unnecessary expenditure. The only cure for this state of things was the purchase of the gas companies, and it was now coming. When the public made its own gas, the price would not matter, as the profits would go towards the diminution of the rates. The subject was ultimately referred to the Works Committee.

COMMERCIAL GAS COMPANY.

The Half-Yearly Meeting of the Shareholders of this Company was held at the London Tavern, on Friday, April 10—THOMAS BRUSHFIELD, Esq., in the chair.

The SECRETARY (Mr. Jaques) having read the advertisement convening the meeting, and the seal having been affixed to the register, the minutes of the last meeting were read, and the following report and statements of account presented:—

The directors report that, notwithstanding the high prices they have been paying for coal and other materials, and the comparatively low price received for coke, there is a balance of profit on the half year of £18,180 5s. 4d., which, with the aid of £4319 14s. 8d. from the reserve-fund, enables them to recommend the payment of the usual dividend of 5 per cent. for the half year (less income-tax).

The directors prefer having recourse to the reserve-fund for the maintenance of dividend rather than raising the price of gas beyond the present rate of 4s. per 1000 cubic feet.

It will be observed that the accounts present an item larger than usual for wear and extension of works. This includes, however, a first payment on account of land, which the directors have deemed it advisable to make, to provide for the increasing demand for gas.

After the current half year, the directors hope to benefit by the falling price of coal to such an extent as to render it unnecessary to have further recourse to the reserve-fund to maintain the dividend, and, after restoring that fund, to again reduce the price of gas to the consumers, whose interests they have ever considered as well as those of the proprietors.

The directors going out of office are Richard Bradshaw, William Christie, and Alexander Thomas Laport, Esqs., who, being eligible, offer themselves for re-election.

Edward Marsh, Esq., auditor, will go out of office, and, being eligible, has given notice of his intention to offer himself for re-election.

1.—CAPITAL: *State of the Account at the End of the Six Months ending Dec.* 31, 1873.

Statute, or Authority, under which raised.	Description of Capital.	Total Paid-up Capital.
Commercial Gas Act, 15 & 16 Vic., c. 155.	Stock.	£450,000.

2.—REVENUE: *Account during the Six Months ending Dec.* 31, 1873.

RECEIPT.				EXPENDITURE.			
Balance brought forward from last account			£3,229 19 10	Management—			
Sale of gas—				Directors allowances	£750 0 0		
At 4s. per 1000 feet	£73,405 9 8			Salaries of secretary and clerks	1,546 16 0		
Public lighting and contracts	7,900 3 7			Collectors commission and pay	575 6 9		
		81,305 13 3		Rent, rates, and taxes of offices	50 0 0		
Sale of residual products—				Stationery, printing, and general charges	628 12 9		
Coke	£27,302 13 2			Payment to auditors	75 0 0		
Breeze	552 8 1					£3,625 15 6	
Tar	1,334 17 11			Manufacture of gas—			
Ammoniacal liquor	2,618 3 6			Coals, including carriage, dues, &c.	£60,586 9 6		
		31,808 2 8		Purifying materials	1,005 16 2		
Miscellaneous receipts		1,393 10 9		Supervision and labour	12,668 13 9		
				Ordinary repair, maintenance of premises, and enlarging works	14,158 2 11		
				Rents, rates, and taxes of manufactory	1,695 17 3		
						90,114 19 7	
				Distribution, including service mains, pipes, &c.—			
				Ordinary repair and maintenance		4,836 19 11	
				Meters—			
				Restoring and replacing		927 3 2	
				Law and parliamentary charges		52 3 0	
				Balance for shareholders profit		18,180 5 4	
		£117,737 6 6				£117,737 6 6	

Required for dividend	£22,500 0 0	
Balance of shareholders profit, as above	18,150 5 4	
Balance to be taken from reserve-fund		£4,319 14 8

Reserve-fund, £32,032 9s. 3d.

The CHAIRMAN, in moving the adoption of the report, said he had very few remarks to offer. During the 30 years that he had been a director of the company, he did not think he had ever stood before the shareholders with greater satisfaction to his own feelings than he did on that occasion. As might well be imagined, the directors, for the last two or three years, had had much anxiety and many difficulties to encounter; but he was thankful to say they had been able to meet their troubles as they arose, and to maintain the prosperity of the undertaking. Those who had been long connected with the Commercial Company knew well the principles upon which it was originally brought into existence. He held in his hand at that moment a document issued at the time, in which it was declared that the company was established in compliance with the desires of a large number of gas consumers, who believed that while they might secure a profitable investment for their capital, they might aid in improving the supply of gas in the district. That was in 1839, and he was proud to be able to stand up and say that from that year to the present the directors had never been more considerate of the interests of the shareholders than they had been of those of the consumers. This was a consumers company still, and he hoped it would exist as such for all time to come. He believed the district they supplied was the only part of London in which there was not a single complaint on the part of the public. He had been asking the question of the engineer, who assured him that there was not a single complaint; certainly, from reading the newspapers it would appear that such was not the case in other districts of the metropolis. They had preserved their integrity; they had preserved the principle upon which the company was founded; and while doing that, they had been able to secure to the shareholders the moderate dividend, which, considering the precarious nature of the business in which they were engaged, they were justly entitled to. On looking through the report, it would be seen that it was necessary to take some money from the reserve-fund to make up the dividend on this occasion. He thought this was the first time they had ever done such a thing. The directors might have avoided doing it now by a slight rise in the price of gas. An increase of 2d. per 1000 cubic feet would have realized more than the amount taken from the reserve, but this increase would have created dissatisfaction in the neighbourhood, and he hoped that by a better state of things in the coal market, they would be able to set matters straight in the next half year. In conclusion, he would remind the meeting that he was getting an old man, and might perhaps never address the shareholders again; but if this was the last time he should speak in that room, he felt that he could say, with pleasure and satisfaction, that the affairs of the company were in the hands of a body of gentlemen who endeavoured to discharge their duty most faithfully, and who were fully deserving the confidence reposed in them.

Mr. BRADSHAW (deputy-chairman) seconded the motion for the adoption of the report.

Mr. BEETON objected to the form in which the accounts were made out, and thought it did not sufficiently disclose the financial position of the company. He observed that the capital had been increased about £12,000 since April last, and asked for an explanation. There was also an increase, since the last report, of £1200.

The SECRETARY said the latter increase was £1107 15s. 8d., received on account of capital and from two small shareholders who had omitted to pay their calls.

Mr. BRADSHAW said the £12,000 appeared in the balance-sheet of the last half year.

Mr. BEETON still complained of the form of the accounts, and said to a young shareholder like himself they were a perfect enigma.

Mr. R. JONES said he would explain the matter, speaking now as a shareholder in the concern. It would be observed that the account laid before the meeting was simply a trading account. It was made out in the form sent down from the Home Office. It did not profess to be what Mr. Beeton assumed it was, and merely stated what the total amount of paid-up capital was, without giving any detail as to how that capital had been expended. But all those details could be ascertained at the office of the company.

Mr. WEBB, one of the auditors, said Mr. Beeton asked for a balance-sheet which the form of accounts dictated by the Home Office did not give. But these were not all the accounts which came before the auditors for examination, and which were open to the inspection of shareholders at the office.

Mr. SAMUDA said the honourable proprietor wished to know how the £450,000 of share capital paid up had been expended, and the answer was easily given. Of the total amount, £417,000 had been actually spent upon works; the remaining £32,000 was employed as the trading capital of the concern, and was required for carrying on the business. For example, a quarter's gas-rental from December to March was due from the customers, and pending the time that the rents could be collected the directors required money to pay wages, coals, and materials of all kinds necessary for the manufacture of gas. This £32,000 was the working capital, no notice of which could be taken in the form of account sent down from the Home Office.

The motion was then put and carried.

The CHAIRMAN moved—"That, pursuant to the recommendation of the board of directors, a dividend of 5 per cent. for the half year ending the 31st of December last, less income-tax, be now declared, and that cheques for the same be forwarded to the holders of stock on the 13th inst."

Mr. BRADSHAW seconded the motion, which was at once agreed to.

On the motion of Mr. LIDDLE, the retiring directors and auditor were respectively re-elected.

Mr. BRADSHAW and Mr. MARSH returned thanks.

Mr. RHODES proposed a vote of thanks to the chairman and directors, and inquired what the present amount of leakage was.

The CHAIRMAN said he was glad Mr. Rhodes had put the question, for it reminded him that he had left out what he intended to be the finest plum in his speech. The shareholders knew that a great outlay was recently incurred on the mains of the company, and he was happy now to inform them that the result had been to reduce the unaccounted-for gas from 12 to 9 per cent., which was about equal to £2000 a year profit to the company.

The vote of thanks was cordially adopted.

The CHAIRMAN, in response, said his colleagues felt, as he felt, highly delighted to receive the thanks of the shareholders. They came before the meeting with clean hands, and with the conviction that they had done the very best in their power to discharge their duty to the company. He hoped they would never prove themselves undeserving of such kind expressions of satisfaction as those they had hitherto been in the habit of receiving. He could not promise that in future they would do more than they had done in the past; but he could assure the meeting that nothing would be wanting on their part to serve so excellent a body of constituents as the shareholders of the Commercial Gas Company.

On the motion of Mr. RHODES, seconded by Mr. LIDDLE, thanks were given to the auditors, engineer, and secretary.

Mr. JONES acknowledged the vote. He said he was much obliged for the kind terms in which it was proposed, and for the handsome manner in which it was received. He would only trespass upon the meeting with the remark that, knowing, as he did, as much about the accounts of the company, in all their details, as any one connected with the establishment, he felt convinced that not one penny was ever expended by the directors which was not laid out with a view to the advantage of the shareholders, at the same time never overlooking the interests of the consumers.

The proceedings then terminated.

THE PROPOSED TRANSFER OF THE BIRMINGHAM GAS-WORKS TO THE CORPORATION.

On Monday evening, April 13, a Public Meeting of Ratepayers of the Borough was held in the Town-Hall, for the purpose of considering the advisability of empowering the Birmingham Town Council to make or concur in an application to Parliament for the confirmation of agreements for the purchase by the mayor, aldermen, and burgesses of the undertakings of the two gas companies in the borough. There was a moderate attendance, the floor of the hall being fairly filled, whilst the number in the galleries was comparatively small. The MAYOR (Mr. J. Chamberlain) presided.

The MAYOR opened the proceedings in a long speech, in which he set forth the advantages of the proposed transfer, and stated the terms upon which the negotiations with the companies had proceeded. He concluded by moving—"That the council of this borough be authorized and empowered to make or concur in an application to Parliament in the present or next ensuing session for the confirmation of agreements for the purchase by the mayor, aldermen, and burgesses of this borough of the undertakings of the Birmingham Gaslight and Coke Company and the Birmingham and Staffordshire Gaslight Company, and for conferring on the mayor, aldermen, and burgesses all necessary powers in relation thereto."

Alderman BIGGS seconded the motion.

Mr. STONE, while assenting to the principle that the gas-works, should be transferred to the corporation, objected to the terms proposed, which he thought were too high. When the terms came before the council, he was very anxious to have considered them fairly; but, so short was the time allowed him for consideration, that he spoke at random. He believed the whole of the members of the council, with the exception of the committee who had the matter in hand, were also in the position of having laid before them a large scheme which they were unable to discuss fairly in so short a time. He looked at the matter as a business man, and still hoped that the matter would be reconsidered, with the view of effecting a good and fair bargain between themselves and the gas companies. If he had been allowed to move an amendment, it would have been "that the matter be referred back to the council to amend the terms." As the mayor said that the Act did not allow of an amendment, he saw no other course open to him than to vote entirely against the proposition. If the proposal was rejected by the ratepayers—and he hoped a poll would be taken upon it—he hoped it would come before the council again, and be more maturely considered.

Mr. DOWNING also spoke in opposition to the motion, and read extracts from replies to some letters he had addressed to the authorities at Leeds, Halifax, Macclesfield, &c., putting various questions as to the advantages or otherwise derived from the purchase of the gas-works, and whether Birmingham could be advised to effect similar purchases. Quoting from the reply received from an alderman of Halifax as to whether the purchase and general management of the works had been satisfactory to the general body of the ratepayers, he said the answer was, "Most assuredly no." If the Birmingham Corporation succeeded in making the proposed purchase, would they build the ratepayers another town-hall? or would it assist them out of the sewerage difficulty? In another part of the letter the alderman in question said, "I have always held the opinion that corporations have no right to become a trading community." The alderman further advised Birmingham to "keep as you are. You have no competition, and although the two companies agreed to sell at the same price now, that arises from the very fact that there are two companies; but if once the corporation lay hold of them, the making and supplying becomes a monopoly, and the consumers lie at the mercy of the Town Council."

Mr. LOWE said the corporation were going to approach the proposed purchase without a shilling of ready money, and that fact should tell them to have nothing to do with it. He considered that the corporation would be nothing else than financial schemers if they adopted the proposition. He compared the scheme to the case of the Overend and Gurney Company, and said the scheme, like that company, would come to grief, and entail heavy loss on the town. He contended that the council ought not to carry on any business. The borough was now in debt to the amount of about £600,000, and they were just negotiating another loan for the purpose of the sewage—about £100,000, in round numbers. They would, also, shortly want another £100,000, probably for the erection of the municipal buildings. One of the companies that they should have to pay cash down to would require £450,000, in round numbers, and they should become responsible to the Staffordshire Company for something like a million. The rateable value of the borough was about a million sterling, and they would have to go into the market to borrow these large sums of money, that would exceed the rateable value, and they would probably not be able to borrow money at the same rate that they now did. If they played with securities or lessened the responsibility and importance of the borough by dabbling with gas, banks, or anything else of the kind, they should become simply financiers. He asked them not to be led away with an idea that they should make profit, because it was quite possible something might happen, and all the matter would be exploded. In regard to Manchester, the corporation there recently proposed to raise the price of gas 5d. per 1000 cubic feet. The council required the Gas Committee to make a profit of 10 per cent., and advances had been made to the Improvement Commissioners in anticipation of profit which had not been realized, and there was some talk of applying to the Board of Trade for a Provisional Order. He urged that they had gas cheaper in Birmingham under the present system than in other large towns. In Manchester it was 3s. 8d. and no discount; in Leeds, 3s. 9d. and no discount; in Halifax, 4s.; and at Glasgow it was 5s. 5d.; Birkenhead, 4s. 6d.; Bradford, 4s. 6d.; and Ripon, 5s. 5d. Comparing Birmingham with these places, they had it cheaper, and therefore let them be satisfied with what they had. The rates could only be reduced by the price of the gas being increased if the corporation had the management of it.

Alderman MANTON said that as to the fear of consumers that the price of gas would be increased by the corporation, he ventured to say that there was not a single member of the corporation who would dare to propose an increase. And he ventured also to say that there was not a member who would feel the necessity of increasing the price. If the scheme were carried out, it would be a great advantage, and not one consumer would suffer in the least; but in the course of a few years £25,000 or £30,000 would be put into the pockets of the ratepayers. If it were not so, he would give £50 to each of the hospitals. If the ratepayers supported the proposition, the mayor would then have courage to deal with the water-works company, and both the water-works and the gas-works ought to be the property of the burgesses themselves. If, however, they defeated this measure, they would make the negotiation with the water-works company impossible. He appealed to every ratepayer, and assured them that the price of gas in the hands of the corporation would not be increased. There would be no necessity for it. If they deferred the matter, they would hereafter have to pay more for the purchase. In the interests of the ratepayers generally, he appealed to them to support the mayor's proposition.

Mr. G. BEARD opposed the motion, and contended that the bargain which the companies had made with the corporation was not an equitable one, the advantages being in favour of the vendors, and not the purchasers. It was clear if the corporation was to make any profit upon the gas it must be by keeping up the price to the utmost limit.

Alderman AVERY supported the motion.

The MAYOR having briefly replied, the question was put, and the mayor declared the motion to be carried; thereupon,

Mr. LOWE demanded a poll of the ratepayers, which the mayor said would be held on the three following days.

The meeting closed with a vote of thanks to the mayor.

RESULT OF THE POLL.—On Friday, at twelve o'clock, the mayor attended at the town-hall to declare the result of the polling. About twenty persons were present. The number of votes polled for the resolution was 2567, and against it 1264, showing a majority of 1303 in favour of the resolution. The number of persons who voted for the resolution was 1219, and the number voting against it, 683; giving a majority of 536. The mayor, therefore, declared the resolution carried. The number of persons entitled to vote is about 53,000.

CONSTANT WATER SUPPLY AND THE PREVENTION OF FIRES.

DEPUTATION TO THE LOCAL GOVERNMENT BOARD.

A deputation from the Council of the Society of Arts waited upon the President of the Local Government Board (Mr. Sclater-Booth), at the office of that department, on Tuesday last, to urge upon the Government the importance of taking measures for the prevention of fires, and placing the whole of the metropolis on the system of constant water supply, with this object specially in view.

The deputation was introduced by Major BERESFORD, M.P., who said his attention having been directed to the insecurity of his water-side premises by the great fire in Tooley Street in 1862, when sheets of flaming material floated down the Thames, he found his only safeguard was some wretched mains of from two to three inches in diameter. He joined with his neighbours in erecting hydrants. In 1872, upon the occasion of the water famine in Bermondsey, he gave notice for a select committee on water supply, and he found that the question had been considered by seven select committees of the Commons, five committees of the Lords, and had formed the subject of three reports to the Board of Trade, the results of all inquiries pointing to the necessity of a constant water supply. Nothing had been done, and it had been stated that the cost of procuring a constant water supply would be 8 millions of money. But a committee of gentlemen had investigated the subject, and they came there headed by a gentleman of high scientific authority, and well known at the Local Government Board—Mr. Chadwick—who would explain that, instead of 8 million pounds being required for the one object of a constant water supply, all that was required could be provided out of the savings made by putting the supply of all London under one management.

Major-General WILMOT handed in a copy of a report made by a special committee of the Society of Arts, to whom it had been referred, "to consider by what mechanical, structural, and administrative means ordinary fires and extraordinary conflagrations in the metropolis may be best prevented." The conclusions at which the committee had arrived were:—

That of the separate sections of the eight trading water companies services in the metropolis—and only about one-third of the mains were kept in a state of constant high pressure by the want of proper hydrants and apparatus, in constant use and preparation—there was frequent delay in obtaining adequate supplies for extinguishing and preventing the spread of ordinary fires, causing frequent loss of life and great loss of property. From these defects in the existing provisions for protection against ordinary fires and incendiarism, and from entire dependence on separate sectional and independent supplies with only the existing defective apparatus, the metropolis was now, from large and increasing masses of ill-protected buildings, peculiarly exposed to increasing dangers on the occurrence of any fire from accident or design during hurricane winds, to devastating conflagrations, such as those which had occurred at Chicago and Boston. To guard against extraordinary conflagrations, as well as to check ordinary fires, measures ought to be taken with the least delay to put the whole of the metropolis on the constant system of supply, under such conditions that the entire force of the whole area of supply might be brought to bear upon any considerable fire occurring in any part of it. Whilst the executive arrangements for the administration of the supplies were disjointed and defective in important parts, there was an estimated waste of upwards of £100,000 per annum of expenditure beyond what would suffice for the administration of a more efficient combined system of local administration. This sum, which might be saved by unity of management, would suffice to relieve the consumers of water from the expense of altering their house services, to defray the expense of the new hydrants required, and of making the other arrangements needed for the protection of the metropolis against extraordinary conflagrations, as well as to give better protection against the ordinary losses of life and property from fire, as well as effect some needed sanitary improvements. Under practical arrangements, whilst the shareholders and officers of the several companies might receive liberal compensation on recognized principles, the consumer might receive an improved constant supply, and the public might receive additional service, without additional rates. Under existing conditions, and the urgency of the earliest arrangements, the most expedient practical course for protecting life and property, and staying accruing waste, will be to appoint a special commission, provisionally, to get the several parts together, to supply the specified defects in the apparatus, and to get the whole into the earliest complete action, in one system, and that system a public one.

Mr. M'LAGAN, M.P., who was chairman of a select committee of the House of Commons appointed to consider the subject in 1867, stated that many water bills were allowed to pass, in which the provisions of the Water Clauses Act were evaded. In four-fifths of the fires which occurred, insurances were found to have been effected, and the committee concluded that a great many of the fires were the work of incendiaries. It was a great encouragement to incendiaries that the causes of fires were unknown. If unity were obtained among the water companies, fires would often be extinguished a few minutes after discovery, the cause would be ascertained, and the incendiary punished.

Mr. EDWIN CHADWICK said that his acquaintance with the subject dated from more than a quarter of a century ago, when he was a member of the General Board of Health, and urged a constant water supply. The carrying out of that conclusion was interrupted in London, but it had been carried out in Manchester, Liverpool, and Glasgow. They at that time examined the application of a constant supply to the extinction of fire only incidentally, and recommended it on other grounds for the sake of the purity of houses and for general reasons. On this occasion he urged it specially for the extinction of

fires in the metropolis. From examination of the evidence given before parliamentary committees, as well as before the Society of Arts, it was found that there was a gain of power of jets by a constant supply, and a loss of power by the present intermittent supply. There would also be a gain in bringing water to bear in two minutes instead of 20. In London the intermittent supply was 33 gallons per head per day, while in Manchester the average quantity of water distributed was 21 gallons per head, and this excess in London was waste and loss of power. In London, as a rule, the jets would be more than one-third lower than in Manchester, and hence, under the existing conditions of the intermittent system, there was the greater need of engine power to augment the force of the immediate water supply. Mr. Quick calculated that the waste in London was above a third, and Mr. Rawlinson also was convinced that it was more than one-third. His own conviction was that the waste was fully one-half. By the adoption of a system of constant supply they should save enormously in water, while a considerable saving would also be effected in regard to administration. Mr. Quick estimated that the waste in the current expenses by reason of the multiplied establishments was upwards of £100,000 per annum; and on one item, that of collecting of rates, it was estimated that something like £15,000 a year would be saved by its consolidation with the collection of the public rates. There were a great many minor expenses to which companies were put which it would not be necessary to incur, if the water supply of the metropolis were under a public authority. The public would be better able than private companies to inspect fittings and prevent waste, and it would also supply water for the roads at a cheaper rate, say 2d. per 1000 gallons instead of 6d. or 1s., than trading companies did. A constant supply would do away with the polluted cisterns of poor houses. The Committee of the Society of Arts might have been satisfied with laying before the president the scientific facts, and have left the legislative and administrative details to be worked out by the department. They had, however, learnt the views of two out of the eight water companies, and had found that the terms of compensation they proposed for officers and office-bearers in the event in the administration of all the companies being united were considered by the officials of those two companies to be fair and satisfactory. It might conduce to practical results if the board would, through its own officers, place the facts of which they were now in possession before each company, and ascertain how far they agreed or disagreed.

Mr. TEULON mentioned that when he was director of the South-Eastern Railway a fire occurred in the arcade at London Bridge Station, where the company had provided hydrants, and, although at the end of the incline there was a fire-engine station, the fire was extinguished by water from the hydrants before the fire-engine could arrive. He also spoke of the expense to which the absence of water at high pressure puts proprietors of large establishments, who have in consequence themselves to put up pumping apparatus.

The PRESIDENT observed that no allusion had been made to the Act of Parliament passed some time since, which laid down that a constant supply of water should be furnished.

Colonel BERESFORD said that his experience was that the Act was quite inoperative.

The PRESIDENT, in reply, said that undoubtedly the intention of the Legislature, in passing the Act of 1871, was to make some advance in the direction which the deputation had pointed out, and which every reasonable man must have in view—namely, to secure a constant supply of water for the metropolis, in order that the poorer classes especially might be provided with so important a necessary of life, and also to make better provision for the extinction of fires. Those were objects as to which there could be no two opinions, and he should be very glad if it should be in his power to further their views by any arrangement or amendment of the law that might be found practicable. But when they suggested that the eight water companies of the metropolis should be dealt with in a comprehensive manner, he need hardly remind them that there were very great difficulties in the way. It was a very large question; and even if his own mind were made up as to its desirability, he could not undertake to commit the Government to such an enterprise without consultation with his colleagues. But the views of those present would be submitted by him in the proper quarter, and the subject would there receive consideration. His own experience as a member of Parliament led him somewhat to deprecate schemes of a comprehensive character. He should have thought that a portion of these companies might be dealt with more easily than the whole of them. Mr. Chadwick had alluded to an estimated saving of £100,000 from the substitution of one commission for the eight companies who at present supplied the metropolis with water; but if that were the same estimate framed by the General Board of Health some years ago, he would point out that there would be great difficulty in relying upon it, because a large proportion of the saving which it was estimated would be effected at that time was based upon the supposition that the whole of the water from the Thames might be taken in at the Eel Pie Island at Twickenham, instead of at the various sources above the locks. They must all feel that, if it were possible in former days, it would be quite impossible now to propose that the water from the Thames should be taken from below Teddington Lock. All he could at present say was that he recognized the great importance of this question, and he should be extremely glad if it should be in his power to make any advance in the direction they had indicated, and which they must all desire.

GAS EXPLOSION AT HEREFORD.—At the meeting of the Hereford Town Council, on the 11th inst., the Gas Committee made a report, in which they stated that about ten o'clock on Sunday night, the 5th inst., the manager received information that an explosion of gas had taken place in Cattle Market Street, and that the gas was then burning in the street. He immediately reduced the pressure, and proceeded to the place with men and tools, and cut off the main at the branch in Widemarsh Street. Upon making an examination of the place, he found that an escape of gas from the main had accumulated in the culvert that conveys water from the Yazor Brook, and by some unknown means took fire and exploded, blowing up the culvert for a considerable distance, and lifting a portion of the pavement; but, fortunately, no damage was done to private property. The noise of the explosion created great alarm in the neighbourhood. The cause of the leak is not yet discovered, but is supposed to arise from the subsidence of the earth about the pipes, which at this place (being made ground) is very loose. A new and much stronger main is being laid down, with a view of preventing a similar occurrence. The old main had been broken on a previous occasion, but without doing any damage.

PROPOSED GENERAL GAS AND WATER-WORKS ACT FOR SCOTLAND.—At the convention of Royal Burghs, at Edinburgh, on the 8th inst., the clerk (Mr. Marwick) mentioned that last year the convention had remitted to the committee to endeavour to obtain a general gas and water-works bill for Scotland. Negotiations, which had failed, had accordingly been entered into with the late Lord Advocate Young; but perhaps the convention might think it desirable to try the present Lord Advocate, who was very much more conciliatory than some of his predecessors had been. Provost Christie (Stirling) remarked that he had been one of the deputation who had waited upon Lord Advocate Young in regard to this question. The right hon. gentleman had refused to have anything to do with the matter, and had pointed out that there were so many difficulties in the way of introducing such a bill, so many interests involved, that it would not be at all easy to frame a general measure which would answer all parties. The clerk remarked that no doubt it was a very difficult question to deal with, but it would be worth while to renew the remit to the committee. It was then unanimously agreed to renew the remit to the committee.

A NEW TEST-PAPER FOR DETECTING UREA.

M. Boussingault has recently presented to the Academy of Sciences in Paris, in the name of M. Musculus, a new method of ascertaining the presence of urea in wells suspected to have acquired sewage contamination from adjacent cesspools. This matter is one of considerable importance to gas companies, for in many cases the latter have been accused of having caused injury to adjacent wells by supposed infiltration of waste from the works, simply because the presence of ammonia was detected in such water. The consequence has been that the companies have been condemned in damages at trials, when the cause of the impurity of the wells had nothing whatever to do with the works, but had arisen from infiltration from adjacent cesspools. The condensed water of the refuse of the gas-works and the contents of an ordinary cesspool equally afford ammonia. But the cesspools alone afford *urea*; hence arises a distinctive test between the two causes of well-pollution.

Urea is a solid, colourless body, readily soluble in water; it largely contains nitrogen, and exists in considerable quantity in urine. A man produces from 30 to 40 grammes daily from voided urine. This substance is readily converted into carbonate of ammonia by the action of a peculiar fermenting body which is produced during the putrefaction of urine. This ferment is always found at the bottom of the vessel in the form of small globules. M. Musculus conceived the idea of collecting these globules, and of drying them at a gentle heat, in the hope of preserving them unchanged until again brought into contact with water. He succeeded in the following manner:—

Urine in an alkaline state of fermentation is poured on to a filter. The liquid at first passes through rapidly, but soon the globules of the ferment enter into the pores of the paper and obstruct them, consequently the rapidity of filtering is greatly diminished. The filter is at last to be well washed with distilled water until all alkaline reaction disappears. It is then to be dried at a temperature of from 35° to 40° C. The paper thus produced is a very sensible reagent for the detection of urea. If it be immersed in a very dilute solution of that substance for about 10 or 15 minutes, the liquid will become charged with carbonate of ammonia, which is, of course, easily detected. The test-paper is that obtained by filtering the white deposit of urine. M. Musculus recommends that the paper should be coloured with turmeric, and after drying it should be carefully kept from moisture in a closed vessel. If a portion of this paper is immersed in a very dilute solution of urea, after a few minutes, small brown spots will appear, ending in producing a deep brown discoloration. In seeking for urea in a liquid, it is necessary first to neutralize it. If it contain alkaline carbonates, sufficient acid should be added to decompose them, otherwise sources of error would naturally arise. Neutral alkaline salts are unobjectionable; they appear rather to favour the action of the ferment. The paper may be used for an approximate quantitative analysis for urea in any liquid by following this method:—Introduce the liquid into a vessel with paper well charged with the ferment and a little tincture of litmus, adding sufficient sulphuric acid to produce a colour resembling that of the red peel of an onion. The liquid is then to be raised to a temperature of 25° to 30° C. for five or six hours, which will generally be sufficient to induce active fermentation. The liquid is then to be titrated for ammonia, which can accordingly be estimated, and, consequently, the amount of urea present may be ascertained. The albumenoid matters present are not altered by the action of the ferment, or, if they are, they require much longer time than is requisite to convert the urea into carbonate of ammonia. The uric acid does not seem to be attacked, since it is found in the state of urate of ammonia, and urate of soda. M. Musculus concludes that he has thus discovered a simple method of detecting, by means of this paper, the presence of sewage infiltration distinct from any effect that might be produced by impregnation resulting from gas refuse liquids. He accordingly strongly recommends it to the notice of gas companies as an available agent for their defence. He gives general directions for its use, and recommends simple methods for the production and use of the paper when no laboratory is at hand. He proposes shortly to enlarge on the subject by communicating the results of further experiments.—*Le Gaz.*

INCREASE IN THE IMPORTATION OF PETROLEUM.—In the quarter ended the 31st ult. the value of petroleum imported was £372,951, against £134,639 in the like period of the previous year.

CARLISLE (CORPORATION) GAS-WORKS.—It was announced a short time ago that Mr. J. Hepworth, the manager of these works, had resigned his appointment, intending to enter into business in the city on his own account. The Gas Committee of the corporation were very reluctant to lose the valuable services of Mr. Hepworth at this particular time, when they have extensive alterations in prospect, and they resolved to make an offer to that gentleman, with a view to induce him to retain his appointment. We understand that they have done so, and that their offer, though not quite coming up to the amount suggested by Mr. Hepworth, has been accepted by him, and was confirmed by the council at their last meeting.

OPENING OF NEW ENGINEERING WORKS AT STOCKTON-ON-TEES.—On Wednesday, the 8th inst, the firm of Messrs. Ashmore and While, Hope Iron-Works, formally opened a new foundry and engineering shops, which they have lately erected in connexion with their present large gasholder and boiler manufactory. On the assembling of a few friends, officials, and workmen, the ceremony was opened by "tapping the cupola," which was gracefully performed by Mrs. Ashmore and Mrs. While, and pouring the first casting, which was satisfactorily accomplished by Mr. Ashmore and Mr. While. An adjournment was afterwards made to the offices, when several toasts, led off by "Success to the firm," were proposed and drunk with great warmth. The principal class of work for which this firm is specially adapted is the manufacture of gasholders of the largest or any size, and gas plant of every description, of which there are no other makers in this district. In addition to the above speciality, they also manufacture boilers, with all mountings complete, general wrought and cast iron work, engines, valves, and pumps, including Worth's patent pump, of which they have the sole right of manufacture. This pump, on account of its great efficiency in pumping thick liquors, tar, &c., is becoming extensively used in this neighbourhood by gas engineers and proprietors of chemical works.

THE DUBLIN GAS BILLS.—An adjourned special meeting of the Dublin Corporation was held on the 11th inst., to receive a report from the deputation appointed to confer with the directors of the Alliance Gas Company, to ascertain what, if any, changes could be introduced into the bills. The report stated that the interview was held on the 4th inst., and that the deputation and the board of directors discussed at much length the various clauses of the two bills, partly the clause defining the quality of the gas to be in future supplied, clause 10 as to the price to be paid therefor, and clause 13 providing for the periodical revision of the price to meet the variation in the price of materials and labour. The clauses in the Corporation Bill were also fully discussed, especially clause 5, which was a compulsory power to the corporation to purchase. The deputation and the board of directors having mutually agreed that they did not possess any power to enter into any definite arrangement, the conference terminated. After the reading of the report, a long discussion ensued, and ultimately it was resolved —"That the clause in the Corporation Bill in relation to the purchase of the gas company's undertaking, by agreement or compulsion, be altered, so that the purchase within three years from the passing of the bill shall be by agreement only, and that we approve of the bill as now in print before the house, as amended; that no agreement be made with the gas company for the sale of their works unless same be adopted at a meeting of the council, duly summoned, at which there shall not be less than 40 members present, and 31 voting for such agreement."

THE NORTHERN COAL TRADE.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the north-eastern district of England was, if anything, a trifle more depressed last week than in the week which preceded it. The utter collapse of business in the coal trade is very astonishing, and from what can be gathered it does not affect the northern district alone, but the coal-fields of the entire country. Few orders come to hand, and prices for every description of coals are very irregular, and, as was stated last week, they are very much governed by the requirements of the collieries. The steam collieries are short of employment, and very many of them are doing little more than five or six days a fortnight. A good deal of gas coal was contracted for in January, and the work at these pits is steadier in consequence; but the very depressed condition of the manufacturing coal trade continues to react upon such gas coal as is offered in the open market, which keeps quotations low. Last year there was a great extension of new colliery work, but in the present condition of the trade, where coalowners are not committed to builders with contracts, they are limiting their operations in that direction as much as possible. The Durham coalowners met last week and determined to stand by the reduction of 20 per cent. The men seem to be pretty determined to resist what they deem so large a reduction, especially as many of the gas collieries have contracts running at January quotations. But, notwithstanding the somewhat hostile-like attitude thus assumed, there is not much reason to fear a general strike or anything of that sort. The men want the subject of wages referred to arbitration, but, failing that, there is little doubt that a compromise will be made. There is not much change in the value of coasting freights; most of the coasting vessels are now in employment, as there has been a demand for handy little vessels to load coals at Blyth Amble or Seaham for the south. A tolerably steady business is done for the Mediterranean, and coals are being shipped by steamers and sailing vessels for the East Indies. The chemical trade is a trifle more firm. On Saturday, Messrs. Allhusen and Co., and some of the larger factories, were reported to have reduced their workmen's wages 10 per cent. The reduction is becoming general in the small factories. The iron trade was a little better last week. The effect of the stoppages of large firms in the neighbourhood of Glasgow was being overcome, and more confidence prevailed amongst merchants engaged in the iron trade. There were some troubles reported from over speculation; but they were satisfactorily arranged, and no harm was done. More men are finding their way into the labour market, and the era of high wages, like high prices, is beginning to find a level.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

Trade here is still in a state of sluggish inactivity. There are few transactions of any size in either ores or pig iron, and the sales of finished iron are merely on a hand-to-mouth scale. Business has also been unsettled by the failure of Messrs. Osborne and Co., of the Clyde Steel and Iron Works, Sheffield, during the week, with liabilities amounting to about £85,000. The creditors are for the most part local, one to the tune of £11,000. The assets are very large, and, I believe, an arrangement is contemplated, whereby the firm will resume operations almost immediately. One cause of the disturbed state of trade is fast being disposed of by the almost general acceptance of a reduction in wages by the men. A conference of blast furnacemen, representing some 15,000 men in various part of the kingdom, was held in Sheffield on Thursday, when resolutions were passed agreeing to a fall of 10 per cent. It is also understood that the malleable ironworkers of the north of England will accept a reduction of similar amount. These, together with the drop in coal, should presently afford a considerable measure of relief to the founders throughout the country, and, consequently, cheapen castings—a question of no little importance to gas and water companies.

A few of the principal foundry firms hereabouts are doing pretty well in pipes and general colliery castings for tubing and the like; but, as a whole, the trade is flat, and not nearly so active as it was a few months back.

The Dronfield Gaslight and Coke Company is about to erect a gasholder-tank and some buildings at its present works. The Wakefield old and new water companies have come to terms, whereby the latter company agrees to withdraw its parliamentary application in favour of the old company's new scheme, receiving £5500 for expenses. The new reservoir, pipes, &c., for the supply of Staveley are nearly finished. The reservoir is situate at Barlow, near the moors, and will at all times afford a good supply. The pipes are already laid to Barrow Hill. The Sheffield Gas Company pays its usual 10 per cent. dividend by taking £2345 7s. 5d. from the reserve fund, which still amounts to £38,221 7s. 11d. The company issues some new £10 ordinary shares, and converts 9970 £10 shares of 1870 into stock. The Sheffield Water-Works Company pays 4 per cent., and also proposes to issue £180,000 of preference shares.

The coal trade of the district is yet remarkably quiet, and prices are being quoted still lower by many of the owners and merchants.

SIR CHARLES ADDERLEY AND THE BIRMINGHAM-WATER-WORKS COMPANY.—A claim by the Right Hon. Sir Charles Adderley against the Birmingham Water-Works Company for £5000 alleged "residential damages," and £200 an acre for about five acres of land taken by them, was heard in London, on the 16th and 17th ult., before Mr. J. Clutton, C.E., the arbitrator. Mr. Biddulph appeared on behalf of Sir Charles Adderley, and Mr. J. Horatio Lloyd and Mr. Philbrick for the company. The claim arose in consequence of the construction by the company of a large engine-house, furnaces, chimney-stack 150 feet in height, and other works near the lodge gates of the Hams estate, but at a distance of seven furlongs from the house. The estate is said to consist of about 2300 or 2400 acres of land, being nearly, if not altogether, in a ring-fence, and is represented as "forming a charming residential estate, possessing a peculiar dormant value from its vicinity to Birmingham." In the Birmingham Water-Works Act of 1870, a clause was introduced, giving Sir Charles Adderley a claim for residential damages, if any, resulting from the erection of such works as those above described. Mr. Couchman and Mr. Huskisson were examined on behalf of the claimant; and stated that, in their judgment, in consequence of the erection of the chimney and works, the estate would suffer at least to the extent of one year's purchase, which would be in round figures the amount above named, and that Sir Charles would be glad to give the company the sum claimed to be relieved of the objectionable works. Mr. W. Fowler, Mr. J. Chesshire, and Mr. W. Mathews, all of whom have great local experience, gave the most positive evidence that in their opinion the damage which would result from the erection of the chimney was so small as to be absolutely inappreciable, and that it could not be expressed by any current coin of the realm; but they admitted that it would be some sort of an "eyesore." It appeared that the chimney could not be seen from any of the lower rooms in the house, nor from the staircase going to the higher rooms, though it was visible from one of the staircase windows; whilst the part that could be seen from the upper windows was a small portion of the head of the chimney, which, it was contended, was rather an agreeable object than otherwise. It was also stated that plans of the works had been sent to the right honourable gentleman, who had made suggestions to the effect that an octagonal chimney should be constructed, with openings in it, and that the company had adopted these suggestions as closely as possible. Sir Charles Adderley, however, in giving evidence in support of his claim, declared that the chimney had been so constructed that it was "the most hideous erection in the country." The arbitrator awarded Sir Charles Adderley £3000 for residential damage, and £130 an acre for the land.

TESTIMONIAL TO MR. SOWOOD OF THE SALFORD GAS WORKS.—On Wednesday evening, April 1, a number of gentlemen in connexion with the Salford Corporation met at the Town Hall, for the purpose of presenting a testimonial to Mr. S. Sowood, previous to his undertaking the appointment of manager to the Belper Gas Company, as a mark of the high esteem which they held for him during 14 years service in connexion with the gas department. The testimonial consisted of a handsome timepiece, suitably inscribed, and a cruet-stand. The meeting was presided over by Mr. Smith, indoor superintendent of the gas department, who accompanied the presentation with an admirable address. Several other gentlemen having made a few remarks, Mr. Sowood acknowledged the compliment paid him, and the proceedings terminated.

TESTIMONIAL TO MR. WATSON, OF THE SHEFFIELD GAS-WORKS.—On Wednesday, the 8th of April, Mr. William Watson, late manager of the Neepsend gas station of the Sheffield United Gaslight Company, was presented with a handsome testimonial by his friends and the workmen at Neepsend on his promotion to the management of the Effingham Street gas station. The company assembled sat down to a very substantial dinner. Mr. John Bradbury, who has been in the company's service for 23 years, was called upon to preside. After the usual loyal and patriotic toasts had been given, Mr. Bradbury proceeded to the business of the evening, and in a short but appropriate speech presented the testimonial, which consisted of a handsome timepiece, gold Albert watch-guard and seal, and a gold pencil-case. On the timepiece was engraved the following inscription:—"Presented to Mr. William Watson, by the workmen of the Neepsend Gas-Works, April, 1874." Mr. Watson, on rising to acknowledge the gift, was received with loud and prolonged applause. He said it was with mingled feelings of regret and pleasure that he now met them. He had been amongst them for 22 years, and had always tried to do his duty to his employers and them. Now, all the old ties had been severed, but he was very pleased to hear the kind words and see the good feeling with which they all received him. Several speakers addressed the meeting, and spoke of the kind, manly, and straightforward manner in which he had carried on his duties while he was connected with the Neepsend works, and hoped he would be spared many long years to come, and enjoy increased prosperity in his new station. The health of Mr. Watson was drunk with musical honours, and the proceedings were enlivened with some capital songs by Messrs. Bradbury, Hamilton, Butcher, and other friends. At eleven o'clock all stood up, and sang in a hearty manner the National Anthem, which brought the proceedings to a close, all agreeing that they had spent a very pleasant evening.

APPOINTMENT OF MEDICAL OFFICER TO THE CITY OF LONDON.—The Corporation of the City of London is in danger of being placed in an unfortunate position just now by some of its members. The corporation has an old-standing self-denying ordinance of great meaning and value, by which members of the court, or persons who have been so within a period of three months from the declaration of vacancy of an office of profit in the gift of the corporation, are forbidden from becoming candidates for such office. The virtue of such a law is rendered sufficiently obvious by the severe throes through which the body corporate passes when, from time to time, offices become vacant for which any member of the body could be considered a suitable incumbent. Sometimes the pressure of affection becomes palpably too great; and the bye-law is suspended. But if this important feature in the civic constitution is not to be altogether abolished, it is evident that such exceptions must not be more than sufficiently frequent to prove the rule. The medical officer of health having resigned some time since, an office fell into the gift of the corporation, which had been filled by two successive incumbents of great eminence, Mr. Simon and Dr. Letheby. It was obviously the duty and the interest of the City at this juncture to fill it by the election, under competition, of the most eminent and highly experienced sanitarian who could be induced to come forward. When, some months ago, the vacancy occurred, the importance and stringency of this obligation was set forth in an article in *The Times*, and the press generally directed attention to the matter. But no step has been invoked to invite candidates; the lapse of time has been taken to aid subtler agencies. The Sewers Committee, with which it is intended that the selection should rest, has been carefully canvassed on behalf of an old fellow-member; and a general testimonial to him for "services to the corporation" in other capacities has kept alive the sense of his claims on the civic body. The delay has further allowed him to give such attendances at a chemical laboratory as should obtain a certificate of having been to school, and an effort has been made to remove from the corporation at large the power of deciding whether or not it will sanction an appointment of this sort. By the fiction that the Commission of Sewers, though wholly consisting of selected members of the corporation, is not n so many words a committee of the corporation, or a dependency of it, an effort will be made to put aside the bye-law, without incurring the scandal of formally abrogating it. We shall see whether it really can succeed.—*Pall Mall Gazette.*

LOCAL GOVERNMENT BOARD INQUIRY AT WIDNES.—The Local Board of Widnes having made application to the Local Government Board for permission to borrow £20,000 for gas-works extensions, £50,000 for water extensions, and £5282 for the expenses of a survey of the district, Col. Cox, C.E., was appointed to make an inquiry into the circumstances, and visited Widnes for that purpose on Tuesday last. It was then stated in evidence that the amount already borrowed on the water-works is £67,295, and of this sum £65,161 has been expended. The amount sanctioned to be borrowed on gas-works account is £26,031, but the sum actually borrowed is 27,640. The capital expended on the gas-works amounts to £29,913. The rateable value of the township, according to the poor-rate made in January, 1874, is £70,958 2s., and they have power to borrow double the amount of such rateable value, besides a sum of £50,000 under the local Act. The total borrowing powers of the board are, therefore, close upon £200,000. The amount of the existing debt is—Gas-works, £24,940; water-works, £63,682; sewerage-works, £6000; the total being £94,622. The net revenue arising from the gas-works for the year ending March 31, 1871, was £4763 3s., and that profit has been expended in extensions. Since the gas-works came into the possession of the board the total profit resulting from them has been £8000; and from the water-works about £1000, which has also been expended in repairs. It was also stated that Widnes is increasing faster than any other town in England. The population has increased in the last three years from 14,000 to 23,000, and the tonnage of the works traffic, which was 350,000 in 1864, has increased to close upon 3,000,000 in 1873. The extensions now required in gas and water are demanded by the growth of the town. The manufacture of gas has increased from 17,500,000 cubic feet in 1869 to 42,250,000 in 1873; and so great is the demand for water that the manufacturers must either have an ample supply from the board or be driven to find an independent one. Mr. Drew, the manager of the gas and water works, stated that the number of the gas consumers had increased from 318 to 685, and they anticipated an increase in revenue from the gas-works of 25 per cent. Plans of the proposed extensions at the gas-works were laid before the inspector, and they included—New telescopic gasholder, £5200; new tank, £2411; retort-house, £6276; railway sidings, £500; purifier, £1550; new mains, £1117. It was stated that the extensions were likely to keep pace with the requirements for three years. Mr. Drew stated that the present storeage of gas was 140,000 cubic feet, and the maximum daily consumption was 290,000 feet. The proposed extension would increase the storeage by 400,000 feet. The extensions in connexion with the water-works, plans of which were laid before the inspector, consisted of—Cooling pond, £1300; new reservoir, £23,000; new mains, £3725; extra mains, £5600; well, £2000; engine, boilers, &c., £5567; rising main, £6125. The inquiry then terminated, and the inspector, accompanied by several members of the board, paid a visit to the water-works.

PRESENTATION TO THE LATE ENGINEER OF THE NEWPORT (MON.) GAS-WORKS.—Mr. J. Bryan, who for 22 years was connected with the Newport Gas-Works, and has just retired from the office of engineer and manager, was presented, a week or two ago, with a very handsome timepiece, subscribed for by the *employés* of the company, accompanied with a suitable address, which indicated the respect and esteem felt for him by those with whom he had been so long associated.

UTILIZATION OF STREET-LAMPS.—The experiment of painting the names of streets on street-lamps is about to be tried in Clerkenwell; and at a recent meeting of the vestry of that parish it was resolved that this course should be adopted in the first instance in the case of 50 street-lamps in the neighbourhood of the Angel and St. John Street Road. There can be no doubt that the plan will prove a great convenience to the public, and that it might be generally adopted with great advantage. On dark and foggy nights especially it is most desirable that facilities should be given to drivers and foot passengers to thread their way through the labyrinth of streets, which even in broad daylight is often a puzzle to those who are not well up in London geography. It would also be a great benefit to the public if the list of cab fares at the different cab-stands were rendered legible at night by means of a transparency. There would be no great difficulty or expense in carrying out this arrangement, and it would prevent these tables being, as at present, utterly useless at night-time. Nor does there appear to be any reason why the "fixed points" at which police-constables are supposed to be constantly stationed should not be marked by coloured lamps, and persons requiring assistance or protection thus be enabled to find a policeman when he is wanted. Notwithstanding the establishment of these "fixed points," not one person in a thousand has any notion where the points are fixed, and, consequently, so far as the public are concerned, the constables might as well be fixed in their own beds at the stations, where, at least, they may be awakened on emergency. In fact, there is much more than mere light to be got out of our street-lamps, and the sooner we utilize them to the fullest extent the better.—*Pall Mall Gazette.*

Register of New Patents.

2214.—ROSS, O. C. D., Craven Street, Strand, "*Improvements in the production of vaporized air for heating purposes generally, and in means for regulating and controlling the admixture of vaporized and other air when employed for such purposes.*" Patent dated June 25, 1873.

The objects of this invention are improvements in the production of vaporized air in the manner of regulating and controlling the supply of air which is necessary to effect the perfect combustion of carbon and hydrogen by mixing these elements with the oxygen of the air previous to their ignition, and to the economical employment of these mixed gases or vaporized air when obtained for the purpose of heating a great variety of furnaces, and other vessels or apparatus in which it is now customary to employ for the purpose other descriptions of fuel.

Accordingly it is proposed to invert the usual method of generating heat, which consists in the combustion of mineral or vegetable fuels, aided by a draught of air drawn over or through the fire, occasioning a great waste of heat, and instead to subject the air before it enters the furnaces, &c., to a treatment which shall enable it to burn with great heat, thus rendering it in many cases unnecessary that there should be any consumption of fuel; and in other cases when the use of fuel is not entirely superseded a very great economy may be obtained. With this view the furnace is supplied with air, which before it enters into combustion must be impregnated with carbon or hydrogen, or both, by passing it through a vessel or vessels containing either petroleum, or other hydrocarbon substances. When a sufficiently volatile fluid is used, evaporating at the ordinary temperature of the atmosphere, the air is passed through the fluid or the vapour therefrom in its normal state, but care must be taken that the evaporation be evenly maintained and that some absorbent material be placed in the evaporating vessel, which will help to hold the particles of hydrocarbon fluid and vapour in suspense, in order that the air may the more easily be impregnated therewith as it passes through the vessel; but sometimes it is necessary to heat the fluid artificially for the purpose of stimulating the evaporation, and in that case the vessel or vessels in which it is contained should be treated either by passing a steam or hot water pipe through the liquid or in any other convenient way. When the air has been thus prepared it will burn with a bright flame, but as it will often contain a larger proportion of carbon or hydrogen than is necessary for its most economical use as a substitute for ordinary fuel, it is then combined with a further quantity of non-prepared air before conducting it to the point of combustion, this additional air being supplied to the pipe by means of a continuous pressure or current, and in order that the whole of the air may be thoroughly mixed before it is ignited, it is allowed first to pass through a mixing chamber, which may be provided with one or more wire gauze partitions, and from thence conducted to the furnace or vessel which is to be heated through pipes or tubes.

2249.—GARFORTH, W. E., Dukinfield, and WALKER, W., Newton Moor, Chester, "*Improvements in steam-pumps for raising or forcing fluids.*" Provisional protection only obtained. Dated June 28, 1873.

According to this invention, the steam cylinder of a pump is fitted with a long piston, in which are formed passages, which, when the piston is near the ends of its stroke, communicate with passages in the cylinder leading to the ends of the valve-chamber. Steam inlet-passages communicate at intervals with recesses in the piston, which recesses open into passages which convey steam to the cylinder, the recesses being shortened or lengthened to alter the rate of expansion. In another form of pump, an inlet and eduction passage proceeds from each end of the valve-chamber; and the piston, when near either end of its stroke, establishes a communication for the flow of steam into one end of the valve-chamber and out of the other end.

2259.—HENDERSON, A. C., Southampton Buildings, Holborn, "*Improvements in water, liquid, gas, and steam gauges.*" A communication. Patent dated June 30, 1873.

This invention relates to apparatus for measuring water, liquids, or gas supplied by conduits, and in the application of the principle, either as lifting apparatus, or as distributors to steam, gas, or other motors.

The mechanism consists of a shaft bearing a valve at each end, and springs for actuating them. The shaft is quite independent, being neither maintained by slides nor guides, and is not deranged by the pressure of the water, liquid, or gas, the valves being equally balanced, and present neutralizing surfaces to the pressure. A lever, furnished with movable rollers for the springs to slide on, turns on axes, or otherwise actuates the shaft and valves by aid of the rollers, as well as a shaft in communication with a ratchet wheel which shows the quantity of liquid or gas delivered, and a central support, the lower end of which is connected to a membrane of metal, india-rubber, or other substance, follows the alternate movement of the latter, causing the lever which is connected to the upper end of the support to describe a segment of a circle, the lever governing a dial register, whilst a measuring capacity, varying according to the nature of employment of the apparatus, represents the volume delivered at each oscillation of the membrane.

2262.—SKOINES, H., Argyll Street, King's Cross, "*Manufacture of charcoal, black lead, lamp black, blacking, moulders oxidizing black, black paint, and black japan, from coke and other residues from the manufacture of gases used for illuminating purposes carbonized from coking and cannel coal, shale, bitumen, or any oleaginous substances.*" Provisional protection only obtained. Dated June 30, 1873.

This invention has for its object the utilization of the waste products arising from the distillation of coal, and consists in the manufacture of black lead, lamp black, paint, black japan, oxidizing black, from coke and other residues from the manufacture of gas for illumination or heating purposes carbonized from cannel coal, shale, bitumen, or any oleaginous substances, by grinding and mixing them thoroughly together with wax, oils, vinegar, ammonia, ammoniacal liquor, or other spirits as required.

2281.—CHAPMAN, L., Collinsville, Connecticut, U.S.A., "*Improvements in rotary pumps.*" Patent dated July 1, 1873.

This invention has several different modifications, but the one essential feature common to all of them is the use of a solid rotating cylinder or cylinders, hung within an outer cylindrical casing, and carrying, in their peripheries, round valves or buckets resting in corresponding sockets in the cylinders; these valves are separate from the cylinders, and will turn from time to time so as to present different wearing surfaces. The valves extend so as just to touch the inside of the containing case. The space between the inner cylinder and the containing case forms the water way. The fluid is drawn in at one side of the pump and expelled at the other. In the first modification there are two inner rotating cylinders, one carrying valves and the other acting as a cut-off. The axes of the valves are hung in circlets, which rotate with the valve-bearing cylinder and lie in the caps which close the ends of the pump. In the second modification there are two valve-bearing cylinders, each equipped with two valves, the axes of which are hung in yokes lying in the ends of the cylinders. The third modification is like the second, except that the valves are held to the cylinders by having the valve socket made larger than a half circle. The fourth modification is like the first, except that the circlets in which the axes of the valves are hung are expanded into end plates for the cylinder, and the cut-off has corresponding plates. The fifth modification is simply the first made double or compound, and the valves are held to the cylinders the same as in the third modification.

2307.—GILES, B., Blackheath, Kent, "*An improved apparatus for heating water.*" Patent dated July 3, 1873.

This improved apparatus is constructed of a cylindrical vessel, in which is placed a number of tubes communicating at their lower ends with the chamber containing gas-jets at the bottom of the apparatus, and with a flue chamber at the top. In the tubes are placed heat conductors of special construction. In a modification, instead of the tubes, concentric cylinders are employed.

2339.—GRICE, R. W., Aix-la-Chapelle, "*Improvements in the manufacture of gas and coke and apparatus connected therewith.*" Patent dated July 5, 1873.

In the process of manufacturing coke, as now most generally conducted, the gas and other products are allowed to escape in the air as of no value; and in the process of extracting gas from coal, the quality of the coke is matter of secondary consideration.

The object of this invention is to conduct the processes of gas and coke making in such a manner as to collect all the constituents of the coal, and yet obtain them of such a quality as to command a high market price; and this double operation is accomplished by an arrangement combining the coke-oven, for the production of first-rate coke, with the gas-retort, for the production of all the other products of a dry distillation of coal, such as gas, tar, ammoniacal liquor, and other products. For this purpose, an oven is built in fire-bricks, similar to a coke-oven, 7, 8, or 10 feet broad, and about the same in height and depth, forming an arched passage, closed with walls at each end. The bottom of this archway, at about 3 feet from the ground line, is divided into four equal divisions, each arched over, and the arches meeting in the middle and butting at right angles against the side and end walls of furnace or oven. This cross of masonry forms the support for the bottom of the oven, which is to be made of fire-clay, like gas-retorts, and of similar shape to the outer arch, but smaller, and built up of longitudinal or transverse pieces strengthened by external ribs; the ends, which may be of uniform thickness with the retort, or thicker, project some inches beyond the front and back walls of the outer arch. To these ends cast-iron frames are firmly and suitably fixed by means of bolts and screws, somewhat as mouthpieces are fastened to clay retorts. The ends are further securely held together by strong iron bands passing round the outer surface of the projecting pieces. To one of these end frames a door or lid is provided, as in coke-ovens and gas-retorts, the whole breadth of the retort, and of a suitable height for withdrawing the contents of the retort or oven. To the other end a discharge-pipe for gas, tar, and other products is fixed, that dips into an hydraulic box below the flooring; from this box the gas, tar, and water are taken off in the usual way. On the top and middle of the interior arch of this combined coke and gas oven an 18 or 20-inch fire-clay tube passes through the outer arch and a little above the brickwork over the arch, where it is suitably fitted with iron mouthpiece and lid; this opening serves for filling the oven from above by means of hoppers running on rails over the centre of these openings.

The two fronts of the four quadrangles above mentioned forming the support for the bottom and the interior of the gas and coking oven, have fire-places, bars, fire-doors, and flues, as in gas furnaces, in which fires are made for heating the inner oven. The coke is to be drawn by means of a small locomotive engine running on rails parallel with furnaces to which suitable tackle is attached, as used for coke ovens. By this arrangement, the time used for charging would be reduced to a minimum, as, with a little practice, the contents of the 3—4 feeders could be shot into the retort in about the same time it at present takes one man to throw three shovels of coal into one retort. The operation requires no skilled labour, and the charge can be equally distributed over the bottom of the retort with little trouble from below.

By the openings below and above the formation of carbon can, by the through draught, be removed in the shortest possible time without danger to the retort, all valuable residuary products besides good gas are also obtained, together with greatly increased celerity of working and saving of skilled labour.

It is proposed to combine the use of furnaces, such as above described, together with the use of retorts such as now ordinarily employed for the production of gas, a good baking coal, prepared by sifting and washing, as for coking purposes, being used in the combined coking and gas-oven of which the gas is only to be collected in the first hours of distillation as long as its illuminating power is not too low, and the best gas coals being used for the production of rich gas in the ordinary clay or iron gas-retorts, the two gases being mixed in the gasholders.

2342.—BONNEVILLE, H. A., "*Certain improvements in fluid-meters.*" A communication. Patent dated July 7, 1873.

This invention consists in a meter composed of a spiral blade mounted on a shaft, one end of which extends through a hole formed in an elbow-joint of the supply-pipe, and connects by suitable gear with a registering apparatus, while its other end is stepped in the end of a screw or pin extending through another elbow-joint that connects with the discharge-pipe in combination with a spiral guide curve, which is firmly secured in the pipe enclosing the measuring-blade in such a manner that whenever the supply-pipe is opened and the fluid allowed to pass over the guide curve to the measuring-blade a revolving motion is imparted to the shaft, and thereby the revolutions of the measuring-blade and the number of gallons or cubic feet of fluid are registered. The registering mechanism is enclosed in a chamber which is cast solid with, or otherwise rigidly attached to the supply-pipe, and from the lowest point of this chamber extends a pipe into that part of the supply-pipe which contains the measuring-blade, so that the fluid which may leak past the shaft into the registering-chamber runs back on the measuring-blade and assists in imparting motion to it.

APPLICATIONS FOR LETTERS PATENT.

1116.—Haigh, A., and Barrett, J. H., Halifax, "Improvements in taps and cocks." March 31, 1874.

1157.—Birch, R. W. P., Victoria Street, Westminster, "Improvements in apparatus for flushing sewers, drains, reservoirs, and other water-ways, applicable also for discharging measured quantities of water or other fluid." April 2, 1874.

1168.—Russ, E., Winchester, "Improvements in the construction of taps or cocks for liquids." April 4, 1874.

1169.—Voisin, J. A., and Dronier, P., Paris, "An improved method of and apparatus for producing a light." April 4, 1874.

1171.—Short, T., Glasgow, "Improvements in apparatus for purifying sewage." April 4, 1874.

1175.—Pearson, E., Old Kent Road, Surrey, "Improvements in water-closets and in taps for the same, also applicable to other purposes." April 4, 1874.

1176.—Pearson, E., Old Kent Road, Surrey, "Improvements in taps, cocks, or valves for adjusting or regulating the flow of liquids and gaseous fluids." April 4, 1874.

1189.—Pattison, J., Naples, Italy, "Improvements in automatic hydraulic apparatus for working pumps and compressing air." April 4, 1874.

1200.—Forbes, Rev. G. H., Broughton, Northampton, "A new or improved method of utilizing the foul lime of gas-works." April 6, 1874.

1207.—Peters, S., and Donald, W., Glasgow, "Improvements in and connected with water-closets, and in part applicable for the supply or discharge of various liquids." April 7, 1874.

1211.—Thomas, C. W. W., Buckhurst Hill, Essex, "Improvements in apparatus for manufacturing heating and illuminating gas." April 7, 1874.

1215.—Ronald, B., and Farmer, J., Glasgow, "Improvements in the modes of and apparatus for regulating the supply of water." April 8, 1874.

1223.—Haseltine, G., Southampton Buildings, London, "Improvements in water-meters." A communication. April 8, 1874.

GRANTS OF PROVISIONAL PROTECTION.

907.—Hunter, A. G., Flint, "New and improved apparatus for carburetting atmospheric air, and improvements in other apparatus connected therewith." March 13, 1874.

919.—Newton, A. V., Chancery Lane, London, "Improvements in the construction and setting of retorts, and in processes of operating retorts for the manufacture of illuminating gas." A communication. March 13, 1874.

934.—Hills, F. C., Deptford, Kent, "Improvements in the purification of gas and gas liquor." March 14, 1874.

935.—Holland, H., Birmingham, "New or improved apparatus for charging atmospheric air with the vapour of hydrocarbon liquid." March 14, 1874.

939.—Teulon, G. A., Hampstead, Middlesex, "Improvements in pumps." March 16, 1874.

942.—Alliott, J. B., Radford, Notts, "Improvements in the construction and arrangement of engines worked by steam or other fluid pressure, which engines are also applicable as pumps for raising and forcing, or as meters for measuring fluids." March 17, 1874.

944.—Warner, W. J., Gas-Works, South Shields, "Improvements in gas-meters." March 17, 1874.

949.—George, R., Worcester, "Improvements in taps, valves, and stop-cocks." March 17, 1874.

991.—Howard, J., Camberwell, Surrey, "A new self-acting apparatus for regulating the supply of water, and disinfectant for flushing and disinfecting water-closets." March 21, 1874.

993.—Lockwood, W., Sheffield, "Improvements in valves for regulating the pressure of water or other fluids." March 21, 1874.

1002.—Smith, A., Loughborough Road, Surrey, "Improvements in the means for purifying water." March 23, 1874.

1015.—Kilpatrick, J., Barrhead, N.B., "Improved construction of gasoliers and reflectors, which latter are also applicable to other lights and gas-jets." March 24, 1874.

1017.—Atkinson, J., Islington, Middlesex, "Improvements in the means of or apparatus for stopping and regulating the flow of air, gases, or liquids through elastic pipes." March 24, 1874.

NOTICES TO PROCEED.

3742.—Scott, H. Y. D., Ealing, Middlesex, "Improvements in the purification of sewage water." Nov. 18, 1873.

3807.—Ross, W., Glasgow, "Improvements in apparatus for supplying and regulating the quantity of water used in water-closets and other cisterns or vessels." Nov. 22, 1873.

3848.—Lake, W. R., Southampton Buildings, London, "Improvements in gas-engines and in apparatus for producing gaseous mixtures to be used in the same." A communication. Nov. 25, 1873.

3868.—Parker, J. F., and Wade, A., Birmingham, "Improvements in the process of and apparatus for the manufacture of coke and illuminating gas." Nov. 26, 1873.

3916.—Underhay, F. G., Clerkenwell, and Carter, A. E., Notting Hill, Middlesex, "Improvements in apparatus for preventing waste of water." Nov. 29, 1873.

3953.—Paget, F. A., Adelphi, London, "Improvements in the mode of and apparatus for softening and purifying water." A communication. Dec. 2, 1873.

251.—Abrahams, A., St. Peter's Park, Middlesex, "Improvements applicable to gas-lamps." Jan. 20, 1874.

919.—Newton, A. V., Chancery Lane, London, "Improvements in the construction and setting of retorts, and in processes of operating retorts for the manufacture of illuminating gas." A communication. March 13, 1874.

942.—Alliott, J. B., Radford, Notts, "Improvements in the construction and arrangement of engines worked by steam or other fluid pressure, which engines are also applicable as pumps for raising and forcing, or as meters for measuring fluids." March 17, 1874.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3171.—Boaz, W., Limehouse, Middlesex, "An improved instrument or apparatus for stopping or closing tubes or pipes." Sept. 30, 1873.

3264.—Gardner, H., Holloway, Middlesex, "Improvements in treating air for the production of hydrocarbon gas, and in apparatus or appliances therefor." A communication. Oct. 8, 1873.

3308.—Newton, H. E., Chancery Lane, London, "An improved mode of connecting gas, water, or other pipes." A communication. Oct. 11, 1873.

3514.—Manwell, J., Glasgow, "Improvements in charging horizontal retorts, and in apparatus therefor." Oct. 13, 1873.

3353.—Clark, A. M., Chancery Lane, London, "Improvements in the manufacture of artificial fuel and in the production of gas for illuminating and heating purposes." A communication. Oct. 16, 1873.

3478.—Worth, R. J., Stockton-on-Tees, "Improvements in steam-pumps." Oct. 27, 1873.

3641.—Peacock, T., Wood Green, and Peacock, J. C., Finsbury Park Road, Middlesex, "Improvements in gas-cooking apparatus." Nov. 8, 1873.

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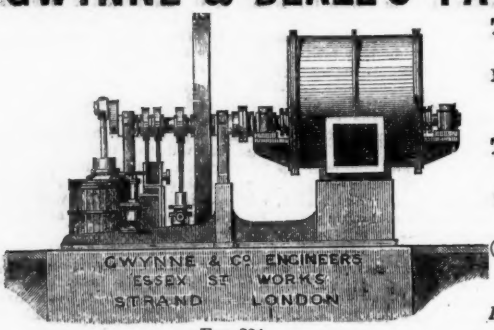

FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

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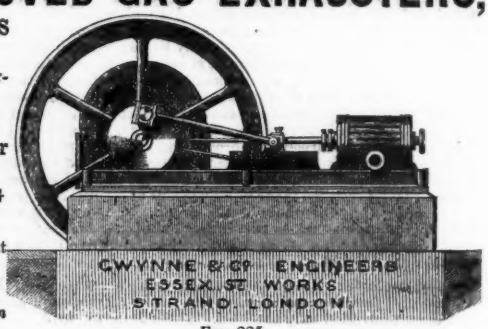

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. Gwynne and Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 *cubic feet Patent Gas Exhausters, and many of all sizes.*

WANTED to purchase, 5000 to 10,000 tons of GAS COKE. Waggons can be sent to any station for any proportion of above.

Address G. J. Eveson, Gas Coal and Coke Merchant, Stourbridge.

WANTED, by the Advertiser, aged 32, an engagement as MANAGER or MANAGER and SECRETARY of a Gas-Work. Has been 15 years connected with Gas-Works. Understands perfectly the manufacture and distribution of gas in all its branches. Can procure first-class testimonials as to ability, &c.

Address B. Z., care of Mr. William Sugg, Vincent Works, Vincent Street, Westminster.

ADVANTAGES OF GAS FOR COOKING AND HEATING,

BY

MAGNUS OHREN, A.I.C.E., F.C.S.

For Companies to issue to their gas consumers.

Specimen Copy by post 4d., direct from Magnus Ohren, Gas-Works Lower Sydenham, London, S.E.

WANTED, an efficient Draughtsman to assist in getting out plans, &c., of a new Gas-Work. None but persons of experience need apply.

Applications, stating age, experience, and salary expected, to be sent to Mr. Charles A. Craven, Engineer, Gas-Works, Dewsbury.

WORKING MANAGER Wanted, for a small Gas-Work (consumption under 1 million), to make and distribute, set retorts, main and service laying, and be able to keep working accounts.

Address, stating salary required, with references, the Secretary, Gas-Works, Lampeter.

VINCENT'S

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IN

Apparatus for Manufacturing Gas.

Particulars to be obtained by application to—

Mr. LAYARD JONES,

Engineer,

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Now ready, price 7s., by Post 7s. 3d.,

A SECOND EDITION (fcap. 8vo., morocco gilt)

OF

THE GAS MANAGER'S HANDBOOK;

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Tables, Rules, and Useful Information for Gas Engineers, Managers,

And others engaged in the Manufacture and Distribution of COAL GAS.

By THOMAS NEWBIGGING, A.I.C.E.

In the present edition the work has undergone careful revision, much new matter has been added, its form has been altered to suit alike the pocket and the desk, and every effort has been made to increase its usefulness, and render it worthy of the position it aspires to fill.

WILLIAM B. KING, 11, Bolt Court, Fleet Street, London, E.C.

WANTED, by the Advertiser, aged 30, a situation as Meter-Fixer, Fitter, Service-Layer, &c., &c.
Address Mr. RUSSELL, 8, Beaumont Road, Barking Road, Plaistow, ESSEX.

WANTED to Purchase, a cast-iron TANK and GASHOLDER to contain from 15,000 to 25,000 cubic feet. Must be in good condition.
State price and full particulars to Mr. J. WATERMAN, Gas-Works, Eye, SUFFOLK.

WANTED, a set of four cast-iron Purifiers, second-hand, 6 ft. square, with wrought-iron lids, 7-in. connexions. Centre-valve.
Any party having such apparatus to dispose of may communicate price and description to the undermentioned.
W. SUTHERLAND, Secretary to the Company.
Shanklin Gas Company, April 14, 1874.

WANTED, an industrious, sober man, to MANAGE and execute the working operations of a village Gas-Work, in all its branches, at Earl Shilton, near Hinckley, Leicestershire.
There is a good house and garden. Gas and coals provided on the premises, for which a nominal price will be charged.
Apply, by letter, in own handwriting, with original references, and stating wages required, to F. ROWE, Earl Shilton, near Hinckley, LEICESTERSHIRE.

TO GAS & WATER ENGINEERS & CONTRACTORS.
THE Advertiser is prepared to undertake the Erection of Gas and Water Works throughout, including the setting of Retorts, fixing of Purifiers, Gasholders, Pumping Machinery, wrought and cast iron Reservoirs and Tanks, the laying of street Main-Pipes, Services, Internal Fittings, &c., either at home or abroad. He is also thoroughly conversant with the working management of both Gas and Water Works, and can give first-class references and testimonials as to ability, experience, &c. He is also prepared to give security for the proper completion of any contract which he may undertake.
Address S. U., 55, Albion Road, DALSTON, E.

ROBUS, SIMPSON, & ROBUS,
(Late of the Crystal Palace District Gas-Works, Sydenham, and the New City Gas-Works, Montreal, Canada,)
GENERAL CONTRACTORS & RETORT-SETTERS, FITTERS & MAIN-LAYERS.
RETORTS SET ON THE LATEST IMPROVED PLAN.
Retort-Setters sent to all parts of Europe and America.
Address, J. and H. ROBUS,
BELL GREEN, CATFORD, KENT.

TO TAR DISTILLERS, &c.
THE Directors of the Windsor Royal Gas Company are open to receive TENDERS for the surplus TAR (about 40,000 gallons per annum) produced at their works, Goswell Road, Windsor, for One, Two, or Three years, commencing on the 1st of June next.
The party obtaining the contract will have to provide a stock of barrels for the removal of the Tar, and bear all expenses incident to cartage, &c.
Tenders to be sent in by the 4th day of May next.
The Directors do not bind themselves to accept the highest or any tender.
By order,
GEORGE CARTLAND, Secretary.
Windsor, April 13, 1874.

FOR SALE—Gas-Works in Hampshire, with possession on the 30th day of June, 1874.
For particulars, apply to Mr. ALFRED LASS, 60, Cornhill, LONDON, E.C.

FOR Gas-Works on Sale, or to Lease, apply to Mr A. C. FRASER, Consulting Engineer, 16 ST. SWITHIN'S LANE, E.C.

GASHOLDER for Sale, 36 ft. by 12 ft. Also small STATION-METER and GOVERNOR, nearly as good as new.
Apply to Mr. A. C. FRASER, 16, ST. SWITHIN'S LANE, E.C.

FOR SALE, and ready for immediate delivery by the Barnstaple Gas Company, about 35 ft. of 12-in. Hydraulic Main, in five lengths; 15 ft. of 16-in. Hydraulic Main; cast-iron Stools for ditto; 21 15-in. Mouthpieces; a number of Ascension-Pipes, Bridges, and Dips; together with a quantity of odd castings suitable for a small work.
Feb. 26, 1874.

SLIDE-VALVES.
FOR SALE—14 12-in. and 5 10-in. Slide- VALVES with outside racks. They have been thoroughly re-fitted, and are equal to new. A low price will be accepted to effect a clearance.
Apply to JAMES WATSON, Engineer and Manager, Crystal Palace District Gas Company, LOWER SYDENHAM, S.E.

CORPORATION GAS-WORKS, BARROW-IN-FURNESS.
FOR SALE—A set of Four Dry Lime PURIFIERS, 8 ft. square, four layers (wood sieves) in each, galvanized iron covers, hydraulic centre-valve, with 9-in. connexions, and lifting crane complete.
Also TWO CAST-IRON SCRUBBERS, 18 ft. high by 4 ft. diameter, top platform, with wrought-iron railings, wrought-iron ladder, 9-in. connexions, including four Donkin's valves complete.
The above are in good working order, and are only disposed of in consequence of enlargement of works.
An inspection of the above plant, and offers to purchase, will be duly considered.
JOHN LEWIS, Manager.
Feb. 5, 1874.

TENDERS FOR GAS COALS.
THE Directors of the Imperial Gaslight and Coke Company, London, are open to receive TENDERS for a SUPPLY of COALS, suitable for the manufacture of gas.
Further particulars and forms of tender, which must be sent in not later than One o'clock on Friday, the 1st of May, may be obtained on application to the undersigned.
HARRY CHUBB, Secretary.
No. 33, John Street, Bedford Row, London, W.C.,
April 17, 1874.

COAL TAR.
THE Directors of the Canterbury Gas and Water Company invite TENDERS for the purchase of their surplus TAR (estimated at 40,000 gallons), for One year, from the 1st of May next.
The contractor must remove the tar from the works at his own expense, as required by the Manager, and pay for it monthly.
The Directors do not bind themselves to accept the highest tender.
Tenders to be delivered at the Company's Offices, on or before Thursday, the 30th day of April inst.
By order,
JAMES BURCH, Secretary.
Secretary's Office, Castle Street, Canterbury,
April 14, 1874.

BAHIA GAS COMPANY, LIMITED.—NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Offices of the Company, 10, Coleman Street, London, on THURSDAY, the 30th day of April, 1874, to receive the Report of the Directors, the Balance-Sheet approved by the Auditors, and for general purposes.
The chair will be taken at Three o'clock precisely.
By order of the Board,
April 16, 1874. ALFRED J. HEAD, Secretary.

THE GEORGETOWN (BRITISH GUIANA) GAS COMPANY, LIMITED.
NOTICE is hereby given that the ORDINARY GENERAL MEETING of the SHAREHOLDERS of the above Company will be held at the Offices of the Company, No. 60, Cornhill, in the City of London, on TUESDAY, the 12th day of May next, at Three o'clock in the afternoon precisely, to receive the Directors Report and the Accounts of the Company for the half year ending the 31st of December last, to declare a Dividend, to elect Directors and an Auditor, in the place of those retiring by rotation, and to transact the general business of the Company.
The Transfer Books will be closed from the 1st to the 12th of May next, both inclusive.
By order of the Board,
ALFRED LASS, Secretary.
Offices, 60, Cornhill, London, E.C., April 14, 1874.

THE Oldham Corporation Gas and Water Works Committee is prepared to SELL BY TENDER the following GAS PLANT, or any portion thereof:—
One 7-in. Gas Station-Meter, in circular case, with hydraulic-valves, bye-pass, clock, and pressure-gauge complete.
One wrought-iron Hydraulic Main, 35 ft. long, and 18 in. diameter, with 12 cast-iron branches riveted on.
One wrought-iron Scrubber, 11 ft. 9 in. by 6 ft., with grids, man-hole, and cover complete.
One wrought-iron Scrubber, 18 ft. 6 in. by 3 ft. 9 in., with grids, man-hole, and cover complete.
One wrought-iron Scrubber, 18 ft. 6 in. by 6 ft. 4 in., with grids, man-hole, and cover complete.
Six 12-in. cast-iron Hydraulic Valves or Traps, with covers and fastenings complete.
One Water Condenser, consisting of one cast-iron cistern, 21 ft. 3 in. by 10 ft. 6 in. by 2 ft. 7 in., with five rows of 12-in. cast-iron pipes, partitions, and covers complete.
A quantity of 12-in. cast-iron Connexion-Pipes
Further information may be obtained on application at the Gas and Water Works Offices, Oldham.
Tenders (endorsed), stating the price for each article separately, will be received up to Tuesday, May 12, 1874.
By Order,
H. BOOTH, Town Clerk.

GAS PLANT FOR SALE.
THE North Staffordshire Railway Com- pany offer the following GAS PLANT FOR SALE, viz.:—
15 15-in. Circular Mouthpieces, Lids and Crossbars.
15 6-in. by 3-in. Taper Ascension-Pipes and Bridge-Pipes.
3 Lengths of Hydraulic Main, 14-in. D shape, 7 ft. 6 in. long each.
6 Furnace Doors.
Set of 6-in. Pipe Condensers, with bottom box, eight pipes 21 ft. high.
Square washer.
2 Purifiers, 8 ft. 6 in. by 6 ft. 6 in. by 4 ft. deep, with wrought-iron lids.
2 Wrought-Iron Purifiers, 4 ft. 6 in. by 4 ft. 6 in. by 4 ft. deep, with wrought-iron lids.
12 6-in. Screw Valves.
Gasholder, 30 ft. by 16 ft., with 9 columns and cast-iron girders.
Gasholder, 30 ft. by 16 ft., with 3 columns and wrought-iron tie-rods.
Station-Meter, with 6-in. bye-pass, capable of passing about 3000 feet per hour.
The whole can be seen, and further information obtained, on application to M. JOHN MCMILLAN, Engineer, Gas Office, Stoke-upon-Trent.
Tenders for the above Plant to be forwarded to the SECRETARY, North Staffordshire Railway Company, STOKE-UPON-TRENT.
Stoke-upon-Trent, April 11, 1874.

TENDERS FOR COALS.
THE Nottingham Gaslight and Coke Company are desirous to receive OFFERS for supplies of SOFT COALS and SOFT COBBLES or NUTS, in quantities of not less than 5000 tons.
The Large Coals and the Cobbles or Nuts are to be separately delivered, where and as from time to time directed, by and at the expense of the Contractors, upon the Gas Company's Station, in the East Croft, at Nottingham, and at the Midland Company's Railway Station, at Nottingham, and also on the Gas Company's Railway Sidings, at Radford and Basford respectively; and at and after the rate of one-eighth part of such total quantity in each calendar month, commencing with the month of July next, till the Company shall be satisfied with the amount of accumulated stock, and afterwards at such rate as shall be from time to time directed, till the agreed quantity shall have been delivered.
The Company will undertake to receive from each person or firm whose tender may be accepted, a total quantity of 5000 tons at the least; but they do not bind themselves to accept the lowest or other tender or tenders, till after a satisfactory trial of the Coals and Cobbles or Nuts, to which such tender or tenders may relate, shall have been made. They are to be the best of their kind, well screened, and as free as possible from sulphur, bats, bind, refuse, and dirt, and shall be weighed (20 cwt. to the ton), upon the Company's machine, or upon such other machine as may be mutually agreed upon.
Payments will be made monthly, if and so long as the contract shall be duly fulfilled, to the extent of nine-tenths of the amount of the verified invoices, and the balance will be discharged on the satisfactory completion of the contract.
Sealed tenders (to be made on forms obtainable at the Company's Office), specifying the description of Coals and the pits at which they are to be raised, and stating the prices for deliveries at the several places and in manner and subject to the conditions aforesaid, must be delivered at the Office of Henry E. Hunt, Esq., Clerk to the Company, on or before Saturday, the 16th day of May next.
By order of the Committee,
T. HAWKSLEY, Engineer to the Company.
Gas Office, Nottingham, April 16, 1874.

TO GAS COMPANIES, ENGINEERS, CONTRACTORS, AND OTHERS.

GEORGE NEWTON,
UNION STREET WEST, OLDHAM,
BRASS FOUNDER AND FINISHER,
MANUFACTURER OF
IMPROVED WET AND DRY CONSUMERS GAS-METERS,
LAMP METERS AND BOXES,
GOVERNORS, GAUGES, INDICATORS, EXHAUST & PRESSURE REGISTERS,
GAS STATION-METERS,
With all the joints planed.
TERMS, &c., ON APPLICATION.

ROBERT DEMPSTER,
GAS ENGINEER AND CONTRACTOR,
ROSE MOUNT IRON-WORKS,
ELLAND, near HALIFAX,
MANUFACTURES AND EFFECTS
GAS APPARATUS & MACHINERY
OF EVERY DESCRIPTION.
GAS EXHAUSTERS,
WITH STEAM-ENGINES COMBINED.
DRY, CENTRE, AND BYE-PASS VALVES; WROUGHT-IRON AND CAST-IRON SCRUBBERS; ANNULAR AND PIPE CONDENSERS, ALL SIZES.
PURIFIERS from 4 to 40 FEET SQUARE.
Steam-Engines and Steam-Pumps.
RETORT SETTERS & FITTERS SENT TO ALL PARTS.
ALL WORK AND MATERIALS GUARANTEED OF THE BEST DESCRIPTION.

ROBERTSBRIDGE GAS COMPANY, LIMITED.

MESSRS. THOMAS & SON have been instructed by the Liquidators of the above Company to offer FOR SALE BY PUBLIC AUCTION, at the "George" Hotel, Robertsbridge, on THURSDAY, the 23rd of April, 1874, at Three for Four o'clock in the afternoon, in One Lot, subject to such conditions as shall then be produced, the recently constructed and complete GAS-WORKS, with the buildings, fixed and moveable plant, machinery, mains, pipes and lamps, and about 1 r. 31 p. of land upon which the gasometer and buildings are erected.

May be viewed, and further particulars had, by applying to Mr. SHEPPARD, Solicitor, BATTLE; or the AUCTIONEERS, BEXHILL (postal address, Sidley, Battle).

SURPLUS PLANT FOR SALE.

TWO New Purifier Covers, 5 ft. 2 in. square, 15 in. deep—by Porter and Co., Lincoln.

1 new Rack Valve, 8 in.

1 Rack Valve, 6 in. 1 Screw Valve, 6 in. Both three years in use.

1 Cast-Iron Cistern, 12 by 12 by 15, with 3-in. sockets.

1 Cast-Iron Cistern, 18 by 18 by 18, with 2-in. sockets.

2 Cast-Iron Cisterns, 12 by 12 by 15, with 2-in. sockets.

1 Connexion for Scrubber, with Flange, 17 in.

2 Tees, 6 in. by 5 in., flange and socket; 1 Tee, 6 in. by 6 in.; 1 Tee, 7 in. by 5 in.; 1 Tee, 7 in. by 2 in.

5 Bends, 6 in.; 1 Flange Bend, 6 in.; 3 Bends, 5 in.; 2 Bends, 4 in.; 1 Syphon complete, 5 in.; 2 Syphons complete 2 in.; 2 Double Sockets, 6 in.; 2 Double Sockets, 7 in.; 1 Double Socket, 9 in.

8 Wrought Tramway Rails, 12 ft. each.

Apply to Mr. T. H. BOUTTELL, Manager, Gas-Works, SLEAFORD.

PONTYPRIDD GAS-WORKS.

TO PIPE FOUNDERS.

THE Directors of the Pontypridd Gas Company, Pontypridd, Glamorganshire, solicit TENDERS for the supply and delivery of about 11,000 yards of Cast-Iron common Socket and Spigot MAIN-PIPES, with all irregular castings necessary in laying the same.

Copies of the specification, with conditions of contract and form of tender, may be obtained on application to Mr. John Lees Cocker, Gas-Works, Merthyr Tydfil (the Company's Engineer).

Sealed tenders, endorsed "Tender for Main-Pipes," to be forwarded to Montague Grover, Esq., Solicitor, Cardiff, on or before Saturday, the 2nd day of May next.

The Directors do not undertake to accept the lowest or any tender.—By order,

MONTAGUE GROVER, Secretary.

Cardiff, April 10, 1874.

SAM. CUTLER & SONS,

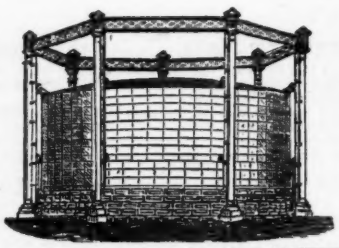
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers**, and **Purifiers**, of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

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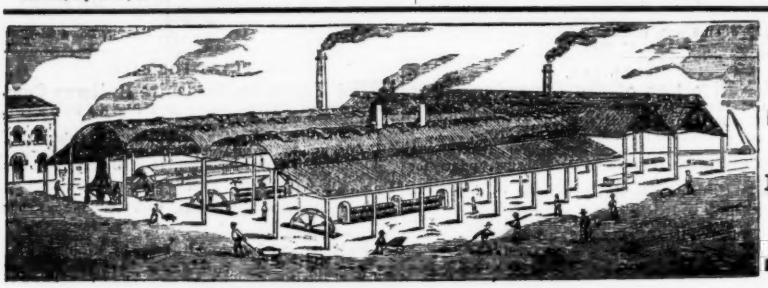
VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water**, and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: **PROVIDENCE IRON-WORKS, MILLWALL, LONDON.**



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MANUFACTURER OF

GALVANIZED CORRUGATED CURVED IRON ROOFING, WROUGHT-IRON FRAMED ROOFING, IRON BUILDINGS

OF EVERY KIND.

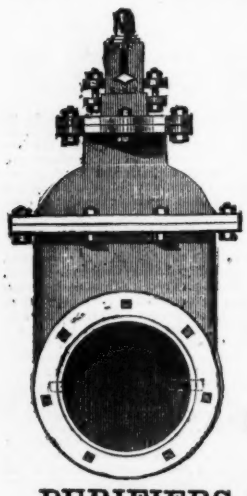
WROUGHT-IRON TANKS, WROUGHT-IRON PIPES & TROUGHS, & GENERAL WROUGHT-IRON WORK.

I. D.'s CORRUGATED CURVED SELF-SUPPORTING IRON ROOFS are specially suitable for Forges, Rolling-Mills, Iron-Works, Shipbuilding Yards Mines, Collieries, Gas and Water Works, and for general purposes.

For Roofs with Timber Framing, I. D.'S GALVANIZED OR PAINTED CORRUGATED SLATES OR SHEETS form a durable and cheap covering, costing only about the same, when fixed complete, as felt and boards.

DRAWINGS AND ESTIMATES ON APPLICATION.

C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

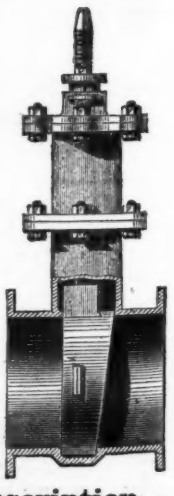
They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.



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WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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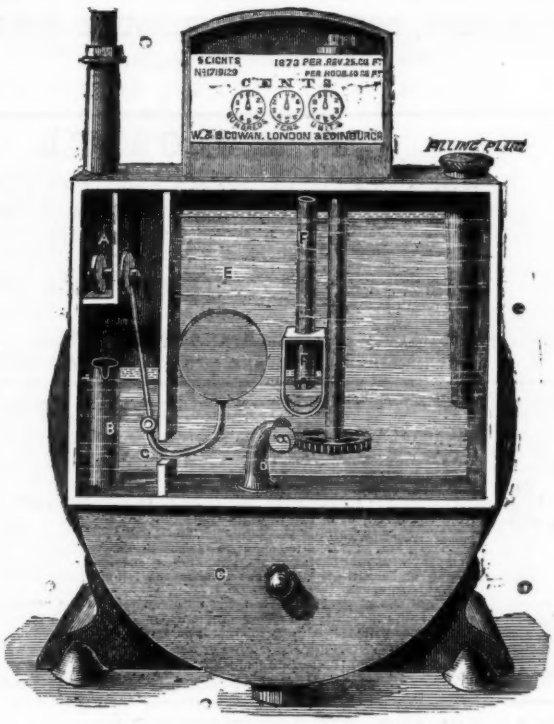
ESSON'S

PATENT COMPENSATING GAS-METER,

IN TIN CASE, PATENT SIDE VALVE ARRANGEMENT.



DESCRIPTION.

The gas passes from the valve-box A by the overflow-pipe B into the waste water box C, and upwards through the spout D to the measuring drum; E is the compensating fountain, in which also is the float, the lever of which, passing through the hole G, opens and shuts the valve.

When the water level in the meter lowers, the *bottom end* of the air or gas tube F becomes unsealed, thereby admitting air or gas into the upper part of the fountain, which, causing water to pass through the hole G, restores the level in the meter, when this action ceases.

The float and valve are beyond the influence of either inlet or outlet pressure, and the fountain is large enough for a year's supply.

SOLE MANUFACTURERS,

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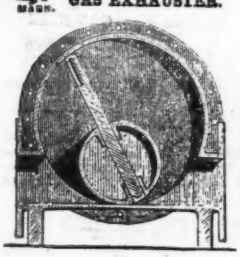
EDINBURGH.

TRADE MARK.

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

Estimates and Prices on application to

B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

GLASGOW CORPORATION WATER-WORKS.

RIVER SUPPLY WORKS.
TO ENGINEERS.

THE Water Committee are prepared to receive TENDERS for the construction and erection of Two HORIZONTAL PUMPING-ENGINES, with double-acting Pumps, Four Boilers, and all necessary suction and discharge pipes, valves, and apparatus. The whole to be of sufficient size and power to raise 7,500,000 gallons of water a height of 65 feet in 21 hours.

The Engines are to be erected on the north bank of the Clyde, about 4½ miles by the river above Glasgow Bridge.

Drawings of the Engines may be seen, and copies of the specification may be obtained, by applying at this Office to the Engineer, Mr. Gale.

Sealed tenders, marked "Tender for Pumping-Engines," and addressed to the Subscriber, will be received at this Office up to Saturday, the 9th of May next.

The Committee do not undertake to accept the lowest or any tender.

By order,
J. D. MARWICK, Clerk to the Commissioners.
Water-Works Office, 23, Miller Street,
Glasgow, April 4, 1874.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields. W. J. WARNER.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.
HENRY GREENE AND SON, Sole Consignees of Brünner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.

By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.

Licences to work the invention will be granted to Gas Companies on very reasonable terms.

For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

TO GAS COMPANIES, ENGINEERS, MANAGERS, &c.

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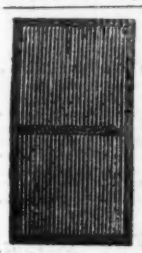

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To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

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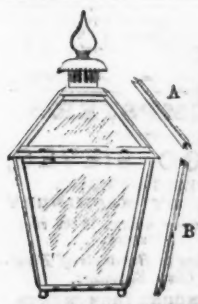
Competent workmen sent out to town or country.

Agents for the supply of the best qualities of South Yorkshire House and Gas Coal. Prices and particulars on application.



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A **KEEN'S PATENT DOUBLE-CLIP STREET-LAMP.**

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They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.

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TABLE GLASS OF ALL KINDS.

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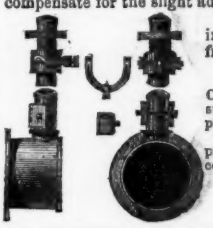
By the adoption of the improved ascensions and joints the trouble and annoyance of "jumping" stopped pipes is entirely obviated, while the time and labour saved will in a very short time amply compensate for the slight additional expense entailed in fitting them to existing apparatus.



In support of his own experience as to the advantages to be derived from the invention, the patentee has the pleasure to submit the following testimonial from the Engineer of the Phœnix Gas Company:—

Phœnix Gaslight Company, Bankside, S.E., Engineer's Office, Dec. 19, 1873.

DEAR SIR,—I have fitted about 20 ascension-pipes at the Vauxhall Station of this Company with your patent joints, I am thereby enabled to remove the pipe when it is stopped and substitute a clean one in about ten minutes, cleaning out the obstructed pipe at leisure.

Until the happy time arrives when we can remove the necessity for "jumping" pipes at all, your joints will afford considerable relief. I trust your neat and ingenious contrivance will meet with the success it deserves. Yours faithfully,

Mr. W. Box, Crayford Gas-Works. C. WOODALL.

For terms and further information, applyt o

W. BOX, GAS-WORKS, CRAYFORD, KENT.

TO MANAGERS AND DIRECTORS OF GAS COMPANIES.

JOHN WRIGHT & Co. feel assured that the introduction of Gas Stoves, either by letting on hire or sale, is greatly to the interest of Gas Companies. The consumption of Gas is thus very greatly increased, and the gas-works made profitable by day as well as by night. Many Companies have adopted this suggestion, and several are now paying us over £1000 per year for our Cooking Stoves.

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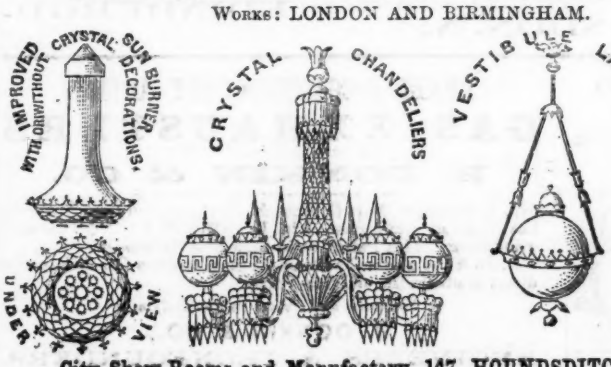

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Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1873, are now complete.

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ESTABLISHED 1830.

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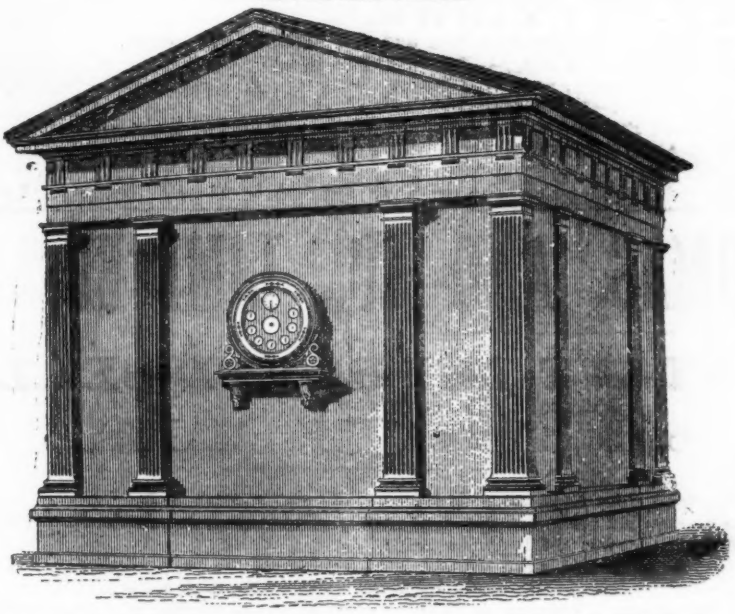
ROUND STATION-METERS,

ON CAST-IRON STANDS.



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WATER-METERS SUITABLE FOR ALL PRESSURES.

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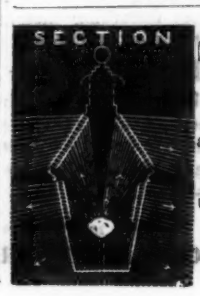

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CATOPTRIC LAMP

Is now in use in Moorgate Street, Cheapside, and Trafalgar Square, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.

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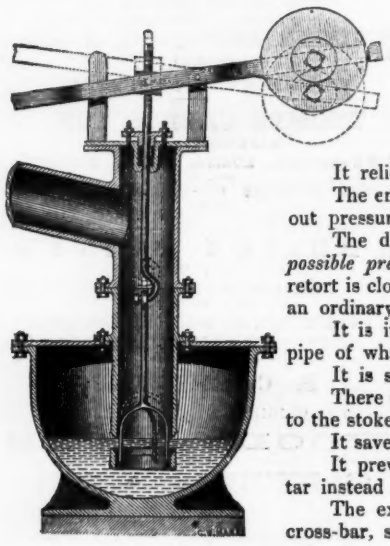

PATENT IMPROVED SEAL

FOR

GAS HYDRAULIC MAINS.

It relieves the retorts from all pressure during the time gas is being made.

The end of the dip-pipe not being immersed in the tar, permits the gas to pass freely, and without pressure, from the retort into the hydraulic main.

The dip-pipe can be effectually sealed without trouble, to resist the back rush of gas, *to any possible pressure*, during the time of charging; but in the event of the Seal being left on, after the retort is closed, no inconvenience is caused, as the piece of pipe used as the Seal only lengthens it to an ordinary dip-pipe.

It is inexpensive, and can be easily and readily applied to any existing hydraulic main and dip-pipe of whatever shape or size, at a trifling cost.

It is simple in its arrangement, and cannot get out of order.

There is no deposit of carbon on the top of the retort, thereby saving considerable time and trouble to the stokers when drawing and charging, also the injury caused by scurfing the retort is avoided.

It saves 10 per cent. of the coal carbonized; also the same proportion of fuel, retorts, labour, &c.

It prevents the thickening of the tar in the hydraulic main, as the heated gas passes *over* the tar instead of being forced *through* it.

The extension piece of pipe is moved by a lever, from which hangs a ⅜-inch rod, hooked on the cross-bar, so that the lid of the retort cannot be struck without first sealing the pipe.

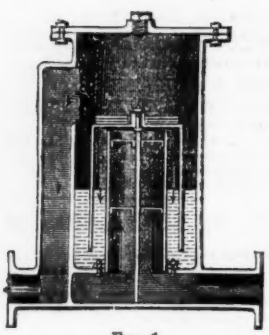

Fig. 1.

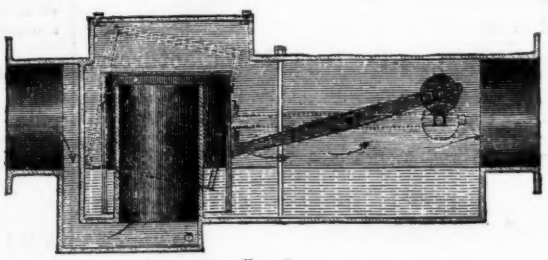

Fig 3.

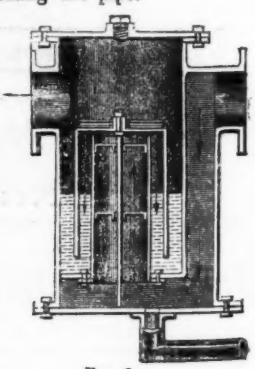

Fig. 2.

BYE-PASS FOR EXHAUSTER (Fig. 1).

This Hydraulic Bye-Pass has been invented for the purpose of supplying to gas companies a cheap, effective, and self-acting valve. It is simple in its construction, cannot get out of order, perfect in its action, can be made to stand any pressure, occupies very little space, and can be adapted to any existing pipes.

Fig. 2 is a Valve similar to Fig. 1, but made to act as a self-acting hydraulic bye-pass for washers, condensers, scrubbers, and meters; the Valve part being *below* the inlet and outlet, so that it may be applied to underground mains. Both Valves can be fitted to existing mains without disturbing them, more than the cutting out of a sufficient length to permit the fitting in of the Valve; after being properly fitted, they will require no further attention.

SELF-ACTING HYDRAULIC SAFETY-VALVE (Fig. 3),

For preventing the back flow of gas from the gasholder, and thereby preventing the possibility of accidents (the great damage and danger to life and property resulting therefrom) through the breaking of pipes, unsealing of purifiers, or any other cause. It is easy and prompt in its action, for upon the forward pressure of the gas ceasing, the bonnet *instantly* closes over the stand-pipe, thereby effectually preventing any return of the gas; no extra pressure is put upon any part of the works by its use, and it can be made to stand any required pressure.

Every information can be obtained, and Models seen, at the Offices of the Company,

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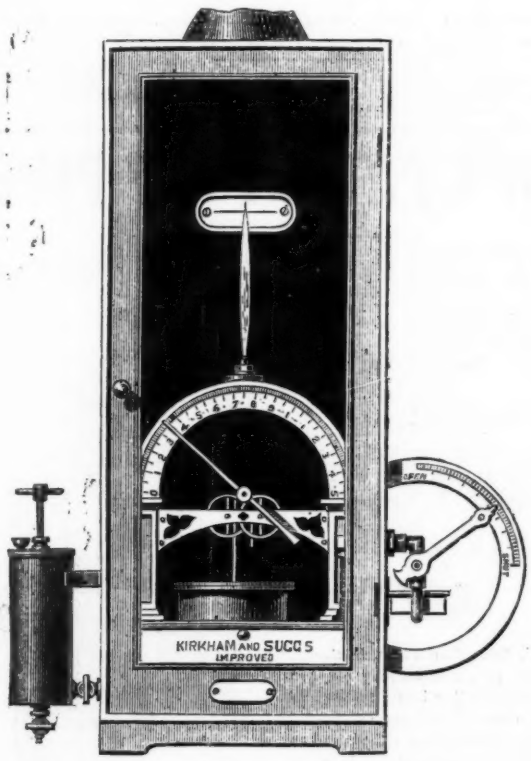

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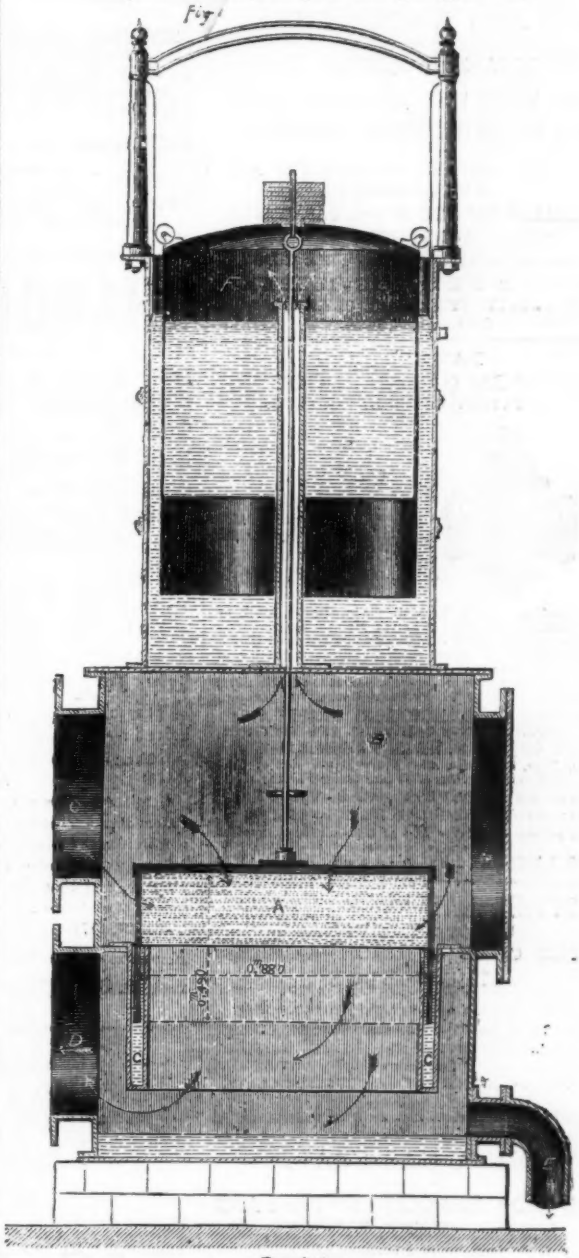

Description.

A.—Condensing apparatus, properly so called.
B.—Chamber in which the apparatus moves.
C.—Inlet for gas.
D.—Outlet for gas after passing condensing apparatus.
E.—Outlet-pipe for condensed products terminated by a syphon.
F.—Regulator by means of which the number of perforated plates in use is varied according to the quantity of gas to be purified.
G.—Water space into which the apparatus dips.

CLAYTON'S PATENT SIX-WAY VALVE only requires one valve to work two purifiers; saves more than three-fourths of the connexion-pipes; requires neither tees, elbows, nor bends; no racks or springs to get out of order.
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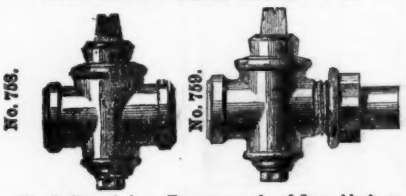

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THE OMOA AND CLELAND IRON AND COAL COMPANY, LIMITED,
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The advantages are—
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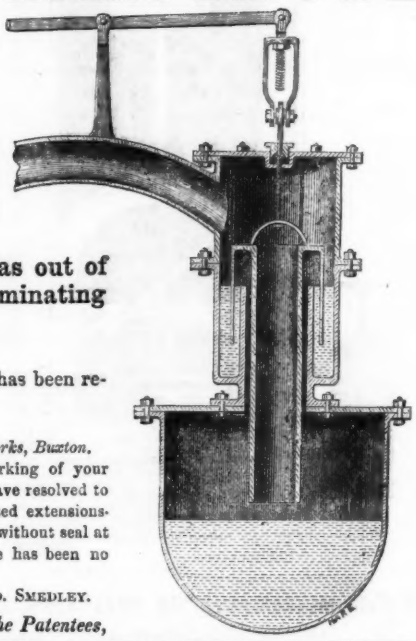
7th, Is never out of order.

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CANNEL FOR GAS-MAKING PURPOSES.
This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
Ports of shipment—Birkenhead or Connah's Quay.
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Yields 12,550 cubic feet of 23-candle gas per ton.
Prices and full Analyses on application.

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Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10,775
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